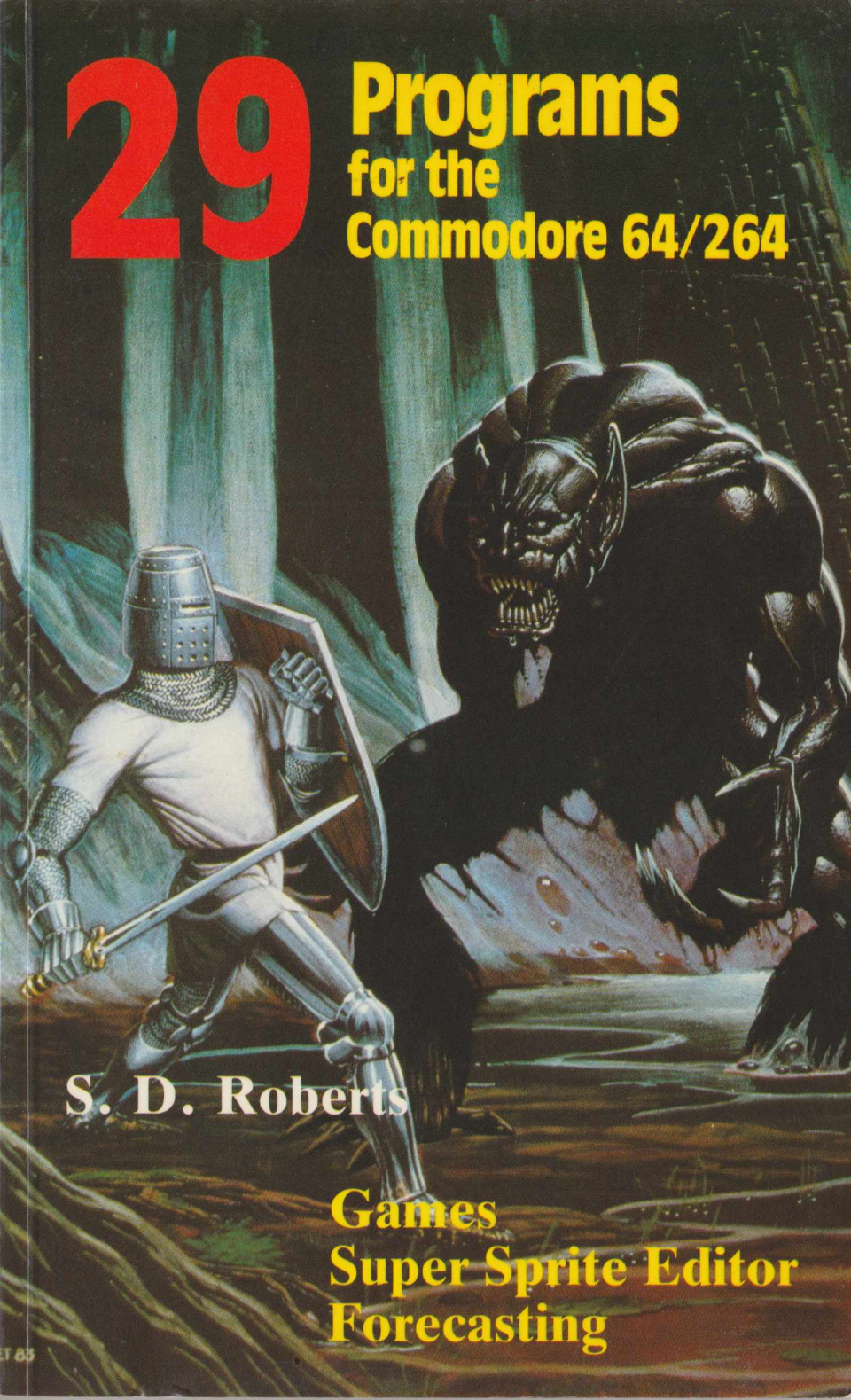
29 Programs for the Commodore 64/264



S. D. Roberts

Games
Super Sprite Editor
Forecasting

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29 Programs for the Commodore 64/264

Here are some samples of the cursor control and color caracters.

```
1 PRINT"■■■■■■":REM CURSOR HOME
2 PRINT"■■■■■":REM CLEAR HOME
3 PRINT"■■■■■■":REM CURSOR RIGHT
4 PRINT"■■■■■■":REM CURSOR LEFT
5 PRINT"■■■■■■":REM CURSOR DOWN
6 PRINT"■■■■■":REM CURSOR UP
7 PRINT"■■■■■■":REM <CTRL>-<RVS ON>
8 PRINT"■■■■■■":REM <CTRL>-<RVS OFF>
9 PRINT"■■■■■■":REM <COMMODORE KEY>-<4>
10 PRINT"■■■■■■":REM <CTRL>-<3>
11 PRINT"FOR OTHER COLORS SEE MANUAL"
12 PRINT"■■■■■■":REM <CTRL>-<6>
13 PRINT"■■■■■■":REM <CTRL>-<7>
14 PRINT"■■■■■■":REM <CTRL>-<2>
```

The listings were printed with a Commodore VC1525 printer. The line width was limited to 42 characters per line. Please take this in account when you count spaces and cursor control characters, or when you try to identify color characters. Use the following figure to count the characters.

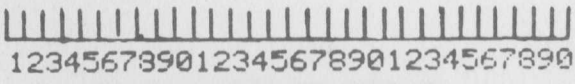


TABLE OF CONTENTS

Because it is not always easy to identify the control characters in a BASIC listing, we put together a summary of the C-64 cursor control characters.

ASCII	PRINTS	DESCRIPTION	
146		Reverse Off	Use CTRL key
18		Reverse On	Use CTRL key
3		RUN / STOP	
147		Clear	CRL
19		Home	
145		Cursor Up	
17		Cursor Down	
157		Cursor Left	
29		Cursor Right	
148		Insert	

1

Runfill

After starting this program with RUN, it takes a while before anything happens on the screen. The computer first has to move the screen memory and the character set.

The game takes place in a maze. The object of the game is to place as many dots as possible in the maze by moving your player around. Two elements are trying to stop you from scoring too high :

1. The computer places dots of its own and erases your dots

2. A spider is moving around in the maze which tries to kill your player. A collision with the spider will kill you.

The time used, the number of collisions, and the score are displayed by the computer. The keyboard or a joystick may be used to play the game.

```
1 PRINT"■■■■■■■■PLEASE WAIT !":PRINT:PRINT
"  LOADING DATA "
2 POKE56333,127:POKE56,67:POKE1,51:Z=24576
:X=53248
3 Y=PEEK(X):X=X+1:IFX=57344THEN5
4 POKEZ,Y:Z=Z+1:GOTO3
5 POKE1,55:POKE56576,6:POKE53272,25:POKE64
8,68:POKE56333,129
9 FORI=25304TO25351:READA:POKEI,A:NEXT
10 DIME$(10),N$(10),PU(10):N$(0)="COMPUTER
"
20 BO=0:DI=37888
30 FORI=828TO986:READA:POKEI,A:NEXT
```

```
40 FORI=996TO1012:READA:POKEI,A:NEXT
45 GOSUB50000
50 SI=54272:POKESI+5,0:POKESI+6,240:POKESI
+24,15
90 PRINT"■":POKE53280,1:POKE53281,1
100 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒
▒▒▒▒▒▒▒▒
200 FORI=1TO5
250 PRINT"▒
      ▒
275 PRINT"▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒
▒ ▒▒▒ ▒
276 PRINT"▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒
▒ ▒▒▒ ▒
277 PRINT"▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒▒ ▒▒
▒ ▒▒▒ ▒
280 NEXT
290 PRINT"▒
      ▒
300 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒
▒▒▒▒▒▒▒
390 XX=80:PU=0:PC=0
400 PO=17490:POKEPO,91:POKEPO+DI,0
500 P5=1:P4=32
1000 AN=17489:X(0)=40:X(1)=-40:X(2)=1:X(3)
=-1
1005 SP=18325
1015 TI$="000000":POKE1010,149:POKE1011,71

1020 LC=AN:POKESI+1,46:POKESI+4,0
1030 AN=AN+X(0)
1040 GOSUB10010:IFPEEK(AN+X(0))=92THEN1040

1050 POKEAN,95:POKEAN+DI,6:POKELC,96:POKEL
C+DI,5
1100 SP=PEEK(1010)+256*PEEK(1011):P1=SP-PO

1105 IFPO=SPTHEN3040
1110 IFP1>=40THENP2=40:GOTO1200
1120 IFP1<=-40THENP2=-40:GOTO1200
1130 IFP1>0THENP2=1:GOTO1200
1140 P2=-1
1200 P3=PEEK(PO+P2):IFP3=92THEN1250
```

```
1205 IFP2=-P5THENP2=P5:GOTO1250
1210 P5=P2
1250 P3=PEEK(PO+P5):IFP3=92THENP5=-P5:P3=P
4
1253 IFP3=95THENP3=32
1255 POKEPO+P5,91:POKEPO+P5+DI,0:POKEPO,P4
:POKEPO+DI,5:P4=P3:PO=PO+P5
3020 SYS(828)
3030 IFPEEK(1012)<>91THEN4000
3040 POKE1012,0:PRINT"▀▚                  ▚COLL
ISION!":GOSUB35000:GOTO20000
4000 VZ=INT(XX-(TI/60)):PRINT"■▚";VZ"▌ ":I
FVZ<=0THEN20000
9999 GOTO1020
10000 REM COMPUTER CONTROL
10010 RA=INT(4*RND(1))
10020 IFPEEK(AN+X(RA))=92THENRETURN
10030 IFX(RA)=-X(0)THENRETURN
10050 CR=X(0):X(0)=X(RA):X(RA)=CR
10060 RETURN
20000 REM
20005 IFBO=1THENPRINT"▚▚                 ▚GAME
 OVER
20010 REM
20020 REM
20030 REM
20040 REM
20050 POKEAN,32:POKESP,32:POKEPO,32
20060 FORP=17489TO18325
20070 IFPEEK(P)=93THENPOKESI+4,17:POKESI+1
,TU:PU=PU+1:PRINT"■▚";PU:POKEP,32
20080 TU=INT(PU/3):POKE54276,0:NEXT
20100 FORI=17489TO18325
20110 IFPEEK(I)<>96THEN20120
20112 POKESI+4,33:POKESI+1,TU
20115 PC=PC+1:PRINT"▚▚▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶▶
        ";PC:POKEI,32
20120 TU=INT(PC/3):POKESI+4,0:NEXTI
20700 BO=BO+1:IFBO=1THENPRINT"▚
      ▚▚▚▚▚  ":XX=INT(PU/10):GOTO400
21000 FORI=1TO500:GETS$:NEXT
21005 PZ=PZ+1:IFPZ=11THENPZ=1:FORI=1TO10:E
$(I)="":NEXT
```

```
21010 PRINT"■■YOUR SCORE      ="PU
21020 PRINT"COMPUTERS SCORE ="PC
21030 PRINT:INPUT"ENTER YOUR NAME";N$(PZ)
21040 IFPZ<2THENPU(0)=PC
21050 PU(PZ)=PU
21052 FORI=0TO10:IFPU(CP)<PCTHENPU(CP)=PC
21054 NEXTI
21055 GOSUB60000
21060 FORI=0TO10:IFN$(I)<>"COMPUTER"THEN21
080
21070 CP=I
21080 NEXTI
21100 PRINT"■HIGH SCORE
21116 PRINT
21120 FORI=0TOPZ
21125 IFI<>10THENPRINT" ";
21130 PRINTI+1".PLACE";E$(I):NEXT
30040 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■NEW GAME
? PRESS Y OR N
30045 REM
30050 GETA$:IFA$="Y"THENPOKE1010,149:POKE1
011,71:GOTO90
30060 IFA$<>"N"THEN30050
30070 END
35000 POKESI+4,129
35010 FORI=255TO0STEP-1:POKESI+1,I:NEXT
35020 POKESI+4,0:RETURN
39000 DATA0,66,165,24,255,36,66,36,0,239,2
39,239,0,253,253,253,0,0,56,40,56
39010 DATA0,0,0,24,90,255,255,255,255,90,2
4,24,60,126,90,126,126,126,60
39020 DATA0,0,0,24,24,0,0,0
40000 DATA173,242,3,133,251,133,253,173,24
3,3,133,252,133,254
40003 DATA162,0,161,251
40005 DATA201,91,208,4,141,244,3,96,162,0,
169,94,129,251,173,241,3,240,3,76,197
40010 DATA3,165,203,232,221,231,3,208,6,18
9,235,3,76,119,3,224,4,208,240
40015 DATA96,48,12,24,101,253,133,253,144,
2,230,254,76,142,3,24
40020 DATA101,253,133,253,176,2,198,254,16
2,0,161,253
```

```
40025 DATA201,92,208,1,96,169,93,129,251,1
69,94,129,253,165,253
40030 DATA141,242,3,165,254,141,243,3,24,1
05,148,133,254,24,165,252
40035 DATA105,148,133,252,169,5,129,251,16
9,8,129,253,169,17,141,4,212,96
40040 DATA234,234,173,0,220,162,0,232,221,
227,3,208,6,189,235,3
40045 DATA76,119,3,224,4,208,240,96
40070 DATA126,125,123,119,62,10,47,44,216,
40,255,1,0,0,149,71,0
50000 INPUT"■■■■■■■■■JOYSTICK CONNECTED (Y/N
)";A$
50002 IFA$="Y"THENPOKE1009,1
50005 PRINT"■       RULES  ?     (Y/N)
50010 GETA$:IFA$=""THEN50010
50020 IFA$<>"Y"THENRETURN
50030 PRINT"■          RULES
50040 PRINT"■TRY TO USE YOUR PLAYER
50050 PRINT"'■ ■' TO FILL THE AISLES WITH
DOTS
50080 PRINT"YOUR PLAYER CAN BE CONTROLLED
WITH :
50090 PRINT"■0■ FOR UP ,■.■ FOR RIGHT ,■A■
 FOR
50100 PRINT"DOWN AND ■,■ FOR LEFT
50110 PRINT"YOUR PLAYER ONLY MOVES, IF THE

50120 PRINT"ACCORDING KEY IS PRESSED.
50130 PRINT"ANY LOCATION YOU PASS WILL BE
MARKED
50140 PRINT"BY A DOT.
50150 PRINT"THE COMPUTER ALSO MOVES A PLAY
ER :
50160 PRINT"'-'. THIS PLAYER DELETES YOUR
50170 PRINT"DOTS. COLLISIONS WITH THE COMP
UTERS
50180 PRINT"PLAYER DON'T MATTER.
50200 PRINT"THE FIRST ROUND LASTS 80 SECON
DS.
50210 PRINT"AFTER THAT THE COMPUTER WILL C
OUNT
50220 PRINT"YOUR DOTS AND YOU WILL GET AN
```

```
50230 PRINT"ADDITIONAL SECOND OF PLAYTIME
FOR
50240 PRINT"EVERY TEN DOTS.
50250 PRINT"                              PRESS
 ANY KEY
50260 GETA$:IFA$=""THEN50260
50270 PRINT"          RULES
50320 PRINT"WHEN THE GAME IS OVER, YOU HA
VE
50330 PRINT"TO ENTER YOUR NAME AND THE COM
PUTER
50340 PRINT"WILL DISPLAY A LIST OF THE TEN
 BEST
50350 PRINT"PLAYERS.
50360 PRINT"                              PRESS A
NY KEY
51000 GETA$:IFA$=""THEN51000
51010 PRINT"READY
51020 FORI=1TO1000:NEXT
51030 PRINT"STEADY
51040 FORI=1TO1000:NEXT
51045 PRINT
51050 FORI=1TO20
51060 PRINT"GO":FORJ=1TO100:NEXT:PRINT"
GO":FORK=1TO100:NEXT:NEXT
52000 RETURN
60000 FORI=1TOPZ:FORJ=PZTOISTEP-1
60010 IFPU(J-1)>=PU(J)THEN60050
60020 HV=PU(J-1):PU(J-1)=PU(J):PU(J)=HV
60030 HV$=N$(J-1):N$(J-1)=N$(J):N$(J)=HV$
60050 NEXTJ,I
60060 FORI=0TOPZ
60070 E$(I)=STR$(PU(I))+" POINTS= "+N$(I):
NEXT:RETURN
READY.
```

Wallbreaker

2

This is the famous arcade game. You must cut out as many bricks from a wall as possible, using a ball that bounces back and forth. You must keep the ball from hitting the bottom wall by moving your paddle. If you miss the ball, it is lost. Each player has five balls. As your score increases, the game starts to speed up. Use keys ',' and '.' to move the paddle.

```
5 PRINT"{CLR}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{DOWN}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}{RIGHT}W A L L B R E
A K E R
9 FORI=1TO2000:NEXT:FA=54272:POKE53281,15
10 FOR I=829 TO 887
15 READ M:POKE I,M
20 NEXT I
25 M=0
30 DATA165,203,201,47,208,21,224
40 DATA0,208,3,76,110,3,169,96,157,199
50 DATA 7,169,160,157,196,7,202,76,110,3
60 DATA 201,44,208,18,224, 27,208,3,76,110

70 DATA 3,169,96,157,197,7,169,160,157,200

80 DATA 7,232,142,224,3,96,174,224,3,76,61
,3
85 REM SUBROUTINE FOR CURSOR CONTROL
100 PRINT "{CLR}{DOWN}{DOWN}{DOWN}{RVS}DO YOU WANT THE RULES ? (Y
/N)"
110 GET A$:IF A$="N" THEN 200
120 IF A$<>"Y" THEN 110
130 PRINT "{CLR}              R U L E S{DOWN}{DOWN}{DOWN}"
135 PRINT "  YOU HAVE TO DESTROY A WALL BU
ILT"
```

```
140 PRINT "  OF THREE LAYERS OF BRICKS BY
"
145 PRINT "  HITTING THE BRICKS WITH THE B
ALL"
150 PRINT "  ▓IF THE BALL HITS THE BOTTOM
"
160 PRINT "  LINE IT IS LOST. YOU HAVE"
165 PRINT "  A TOTAL OF 5 BALLS "
170 PRINT "  THE BALL CAN BE THROWN BACK W
ITH"
177 PRINT"  THE CURSOR. TO MOVE THE"
179 PRINT "  CURSOR USE ´,´ FOR LEFT AND"
180 PRINT "´.´FOR RIGHT."
182 PRINT:PRINT
185 PRINT"▓▓  PRESS ANY KEY WHEN READY !"
190 GET A$:IF A$="" THEN 190
195 REM EXPLANATION OF RULES
200 PRINT "▓"SPC(4)"▓▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
▬▬▬▬▬▬▬▬▬▬"
205 PRINT "▓"SPC(4)"▓▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
▬▬▬▬▬▬▬▬▬▬"
210 FOR I=1 TO 3
220 PRINT SPC(4)" |"SPC(30)"| "
230 NEXT I
240 PRINT SPC(4)" |▓|_|_|_|_|_|_|_|_|_|_|
|_|_|_|_|BALL";
250 PRINT SPC(4)" |▓|_|_|_|_|_|_|_|_|_|_|
|_|_|_|_|"
260 PRINT SPC(4)" |▓|_|_|_|_|_|_|_|_|_|_|
|_|_|_|_|"
270 FOR I=1 TO 17
280 PRINT SPC(4)"▓|"SPC(30)"|"
290 NEXT I
295 PRINT SPC(4)" |                   ▓  ▓
        |"
299 REM DRAW PLAYFIELD
300 POKE 992,14:S=30
305 REM STARTING POSITION OF CURSOR
310 SI=54272:POKESI+6,240:POKESI+13,240:PO
KESI+20,240
320 POKESI+24,15:POKESI+1,49:POKESI+8,30:P
OKESI+15,15
```

```
330 POKESI+5,0:POKESI+12,0:POKESI+19,0
400 N=1:GOSUB 1080
500 FORI=56261TO56290:POKEI,8:NEXT
505 P=1309+INT(RND(1)*30):POKE P,81:POKEP+
FA,5
510 RD=INT(RND(1)*3)+1
520 ON RD GOTO 530,540,550
530 R=39:GOTO 560
540 R=40:GOTO 560
550 R=41:GOTO 560
555 REM RANDOM POSITION AND DIRECTION OF B
ALL AT BEGINNING
560 REM
565 REM 'SHIFT'-KEY
600 POKESI+4,0:POKESI+11,0:POKESI+18,0:SYS
(882)
602 FOR K=1 TO S:NEXT K
605 SYS(882)
607 Z=PEEK(P+R)
610 IF Z=32 THEN POKE P,32:P=P+R:POKE P,81
:POKEP+FA,5:GOTO 600
615 REM PLAYFIELD OPEN
620 IF Z=96 THEN N=N+1:GOSUB 1000:GOTO 500

625 REM BALL HAS HIT BOTTOM LINE
630 IF Z=117 THEN R=R-2:POKESI+4,17:GOTO 6
00
635 REM RIGHT BORDER
640 IF Z=118 THEN R=R+2:POKESI+4,17:GOTO 6
00
641 REM LEFT BORDER
642 IF Z=160 AND PEEK(P+R+1)<>160 THENPOKE
SI+11,33:R=-39:GOTO 600
643 IF Z=160 AND PEEK(P+R-1)<>160 THENPOKE
SI+11,33:R=-41:GOTO 600
645 REM LEFT AND RIGHT PART OF CURSOR
650 IF Z=121THENPOKESI+4,17:R=R+SGN(R)*(-8
0):GOTO 600
652 IF Z=160THENPOKESI+4,33:R=R+SGN(R)*(-8
0):GOTO 600
655 REM CENTER OF CURSOR
660 POKE P+R,32
662 IF Z=204 THEN POKE P+R+1,32:M=M+1:POKE
```

```
SI+18,33:GOTO 666
664 IF Z=250 THEN POKE P+R-1,32:M=M+1:POKE
SI+18,33
666 IFM>35THENS=0:GOTO 669
667 IFM>25THENS=10:GOTO 669
668 IFM>10THENS=20
669 IF M=45 THEN 800
670 R=R+SGN(R)*(-80):PRINT"■■";M;"■ ":GO
TO 600
675 REM BRICK WAS HIT
800 IF M<45 THEN 900
805 IF N=1 THEN PRINT "■■■■YOU HAVE DESTR
OYED THE WALL WITH ONE BALL":GOTO 830
810 PRINT "■■■■YOU HAVE DESTROYED THE WALL
 WITH";  N;"BALLS"
830 ON N GOTO 840,845,850,855,860
840 K$="TOP CLASS": GOTO 870
845 K$="EXCELLENT": GOTO 870
850 K$="VERY GOOD": GOTO 870
855 K$="NOT BAD":GOTO 870
860 K$="CLOSE"
870 PRINT "■THAT WAS ";K$;"!"
880 GOTO 940
900 PRINT "■I'M SOORY YOU DIDN'T MAKE IT"
920 PRINT:PRINT "MAYBE NEXT TIME !"
940 PRINT "■■■DO YOU WANT TO TRY AGAIN (Y/
N)"
960 GET A$
970 IF A$="Y" THEN N=1:M=0:GOTO 200
980 IF A$<>"N" THEN960
985 PRINT"■"
990 PRINT"■■■BYE BYE !"
995 END
999 REM DISPLAY OF RESULTS
1000 POKE P,32:P=P+R
1010 FOR I=1 TO 5
1020 POKE P,81:POKEP+FA,2:POKESI+1,15:POKE
SI+4,33
1030 FOR J=1 TO 50:NEXT J:POKESI+4,0
1040 POKE P,96:POKESI+1,10:POKESI+4,33
1050 FOR J=1 TO 50:NEXT J:POKESI+4,0
1060 NEXT I:POKESI+1,49
1070 IF N>5 THEN 800
```

```
1080 B$=STR$(N)
1130 POKE 1262,VAL(RIGHT$(B$,1))+176:POKE5
5534,0
1140 RETURN
1150 REM SUBROUTINE FOR BLINKING AND DISPL
AY OF NUMBER OF BALL
READY.
```

NOTES

MAMICO 3

Versions of this game are known under the name MASTERMIND (R).
You can play it on your C-64 like in the original version, with up to eight colors. You can select the colors and you can choose whether you want to guess different or the same colors.

After you have started the program with RUN it takes a while before anything happens on the screen. You have three options :

1) The player tries to guess the computers combination.
You can choose from 5 to 8 colors.
The cursor will be placed in the first box. Press a number from 1 through 8 to select a color for every box. The cursor can be moved left and right with the cursor control keys. After you hit RETURN you will get a report about your guess. The left of the two numbers tells you the number of correct colors in the wrong place, the right number tells you the number of colors in the correct position.
When you press 'H', the computer will disclose its combination.

2) The computer guesses.
If you select this option, the computer tries to guess the combination you are thinking of. The computer tells you what it thinks is your combination and you have to tell it how many colors are correct, but in the wrong place, and how many colors are in the correct

position (separate the two numbers by a a comma).

3) The computer plays against itself (demo of the game).

```
1 POKE56333,127:POKE56,67:POKE1,51:Z=24576
:X=53248
2 Y=PEEK(X):X=X+1:IFX=57344THEN4
3 POKEZ,Y:Z=Z+1:GOTO2
4 POKE1,55:POKE56576,6:POKE53272,25:POKE64
8,68:POKE56333,129
6 FORI=1TO18:READA:NEXT:FORI=845TO1019:REA
DA:POKEI,A:NEXT
10 PRINT"■":PRINTTAB(5),"M A S T E R M I N
 D"
20 REM
30 PRINT:PRINT:PRINT:PRINT
40 PRINT"■ COPYRIGHT BY RAINER HEIGENMOSER
 1983
50 FORJ=1TO3000:NEXT:POKE53280,8:POKE53281
,8:POKE54296,15
55 POKE1014,0:POKE1015,0:POKE1016,0:POKE10
17,0:POKE1018,0:POKE1019,0
56 POKE59468,12
57 PRINT"■■":XX=PEEK(1014):QQ=PEEK(1018):U
U=PEEK(1019)
58 YY=PEEK(1015):TT=PEEK(1016):PP=PEEK(101
7):TT=TT+PP/100:QQ=QQ+UU/100
59 PRINT"     COMPUTER                YOU
60 PRINT:PRINT"   SCORE  TIME          SCOR
E  TIME
64 PRINT:PRINTTAB(4)XX;TAB(9)TT;TAB(24)YY;
TAB(29)QQ
65 FORI=1TO3000:NEXT:PRINT"■":GOTO6000
68 PRINT"■■■■■■■■■■■■■■■■■■■■"
70 PRINT"ENTER NUMBER OF POSSIBILITIES DES
IRED !
72 GETN:IFN=0THEN72
75 IFN<5THENPRINT"■ENTER 5 OR HIGHER PLEAS
E":FORI=1TO2000:NEXT:GOTO68
77 IFN>8THENPRINT"■ENTER 8 OR LESS PLEASE
 ":FORI=1TO2000:NEXT:GOTO68
```

```
80 PRINT"J"
90 PRINT"QQQQQQQQQQ":PRINT"SHOULD I CALCUL
ATE 5 DIFFERENT NUMBERS ?
100 PRINT"ENTER 'Y' OR 'N' PLEASE !
102 GETX$:IFX$<>"Y"ANDX$<>"N"THEN102
105 PRINT"J":PRINT"PLEASE WAIT !
500 FORKK=1TO5
510 A4%(KK)=INT(RND(1)*N)
530 IFX$="N"ORKK=1THEN600
540 FORII=1TOKK-1
550 IFA4%(KK)=A4%(II)THEN510
560 NEXTII
600 NEXTKK
700 FORCC=0TO7:EE%(CC)=0:FORDD=1TO5:IFA4%(
DD)=CCTHENEE%(CC)=EE%(CC)+1
710 NEXTDD,CC
720 AA$="":FORKK=1TO5:AA$=AA$+MID$(STR$(A4
%(KK)),2,1):NEXT
1210 IFQ$="3"THEN6070
2010 REM
2015 PRINT"OK, I GOT IT, LET'S BEGIN ":FOR
J=1TO1000:NEXT:PRINT"J"
2018 QQ=TI:Z=Z+1
2020 PRINT"■       |      ╭─╮   ╭─╮   ╭─╮
 ╭─╮  ╭─╮
2035 PRINT
2040 PRINT"     |      ╰─╯   ╰─╯   ╰─╯   ╰
─╯   ╰─╯
2045 IFQ$="2"ORQ$="3"THEN10090
2050 PRINT"TTT"
2051 GOSUB30000:PRINT
2052 IFEI$="H"THENFORI=1TO8000:NEXT:PRINT:
PRINT:PRINT:GOTO6000
2055 UU=UU+(TI-QQ):FORU=1TO5
2056 X(U)=X(U-1)/10:X(U)=INT(X(U)):H(U)=X(
U)*10:H(U)=X(U-1)-H(U):NEXT
2060 IFQ$="3"THEN3000
2065 PRINT"TT":PRINTZ"■. ":PRINT"TT":PRINT
TAB(6);"|";SPC(4);" |";SPC(1);"|   |
2070 PRINT"TT":PRINTTAB(20);"|   |";SPC(1)
;"|   |";SPC(1);"|   |";SPC(1);"|"
2080 IFQ$="2"ORQ$="3"THEN11010
3000 BB$=""
```

```
3010 FORI=1TO5:BB$=BB$+MID$(STR$(H(-I+6)),
2,1)
3020 NEXT
3030 FORFF=0TO7:GG%(FF)=0:FORHH=1TO5
3040 IFVAL(MID$(BB$,HH,1))=FFTHENGG%(FF)=G
G%(FF)+1
3050 NEXTHH,FF:GG%=0
3060 FORFF=0TO7
3070 IFEE%(FF)>GG%(FF)THENGG%=GG%+GG%(FF):
GOTO3085
3080 GG%=GG%+EE%(FF)
3085 NEXTFF
3088 HH%=0
3090 FORHH=1TO5
3100 IFMID$(AA$,HH,1)=MID$(BB$,HH,1)THENHH
%=HH%+1
3110 NEXT
3120 X=GG%-HH%:Y=HH%
5020 PRINT"■■":PRINTTAB(4);X
5030 PRINT"■■":PRINTTAB(6);Y
5040 IFQ$="3"THENB%(T%)=X:C%(T%)=Y:GOSUB30
070:GOTO11002
5045 PRINT:IFY=5GOTO5100
5050 GOTO2018
5100 PRINT:PRINT:PRINTTAB(8);"CONGRATULATI
ONS !!!
5200 PRINT:PRINTTAB(7);"YOU ARE A SMART KI
D !":GOSUB31000:PRINT""
5204 UU=INT(UU/60)+PEEK(1018)*60+PEEK(1019
):QQ=INT(UU/60):UU=UU-QQ*60
5206 POKE1018,QQ:POKE1019,UU
5210 Z=Z+PEEK(1015):POKE1015,Z:GOTO57
5000 CLR:PRINTTAB(10)"PLEASE SELECT !":PRI
NT:PRINT
5010 PRINT"1  YOU GUESS":PRINT"2  COMPUTER
 GUESSES":PRINT"3  COMPUTER DEMO
6020 GETQ$:IFQ$="1"THENCLR:GOTO68
6030 IFQ$="2"THEN6050
6035 IFQ$="3"THENN=8:X$="N":GOTO500
6040 GOTO6020
6050 PRINT"■IF YOU HAVE A COMBINATION (8 C
OLORS), PRESS ANY KEY !
6060 GETR$:IFR$=""THEN6060
```

```
6070 TT=TI:DIMG%(8,12):O$="01234567":DIMA1
%(11)
6075 Z=0:PRINT"■":S%=1:T%=1:U%=1:V%=1:Z%=0

6080 A$(1)="01234":A$(2)="55667"
8030 IFT%=1THEN8500
8040 IFT%=2ANDD%(1)<5THEN8500
8050 ONB%(1)GOSUB13100,13200,13300,13400,1
3500
8060 ONB%(2)GOSUB14100,14200,14300,14400,1
4500
8061 V$=M$:N%=LEN(V$):D1%=D%(1):IFD1%<>0TH
ENGOSUB16000:M$=W$
8062 V$=N$:N%=LEN(V$):D1%=D%(2):IFD1%<>0TH
ENGOSUB16000:N$=W$
8070 N%=N%+1
8080 W%=D%(1)+D%(2)
3090 IFD%(1)=0ANDD%(2)=0THEN8125
8095 IFW%=1THENIFB%(1)=1ORB%(2)=1THEN8125
8100 C$=MID$(M$,U%,D%(1)):F%=1:S%=1
8110 D$=MID$(N$,V%,D%(2))
8115 IFC$=""ANDD$<>""THEN8117
8116 GOTO8120
8117 V%=V%+D%(2):IFV%>N%THEN8125
8118 IFD%(1)=0THEN8140
8119 U%=1:GOTO8100
8120 IFC$<>""ANDD$=""ORC$<>""ANDD$<>""THEN
U%=U%+D%(1):GOTO8140
8125 PRINT"■■■■":FORI=1TO20:PRINT"■WRONG
INPUT !":FORJ=1TO50:NEXTJ
8126 PRINT"■                    ":FORJ=1TO50:NE
XTJ,I:GOTO6000
8140 IFW%<5THEN12000
8142 S%=0
8145 F%=2
8150 U$=C$+D$+F$
8160 IFU$=A$(T%)THEN12000
8170 A$(T%)=U$
8500 FORA8=1TO8:G%(A8,T%)=0:NEXT
8510 FORB8=1TO8:FORC8=1TO5
8520 IFMID$(O$,B8,1)=MID$(A$(T%),C8,1)THEN
G%(B8,T%)=G%(B8,T%)+1
8530 NEXTC8,B8
```

```
8540 IFT%<3THEN10085
8550 FORD8=1TOT%-1:G%=0
8560 FORE8=1TO8
8570 IFG%(E8,T%)>=G%(E8,D8)THENG%=G%+G%(E8
,D8):GOTO8590
8580 G%=G%+G%(E8,T%)
8590 NEXTE8
8600 IFG%<>D%(D8)THEN12000
8610 NEXTD8
9000 FORI=1TO5:POKE834+I,VAL(MID$(A$(T%),I
,1)):NEXT:SYS(850)
9010 ONPEEK(834)GOTO10086,10065
10065 T%=T%-1:IFD%(T%)=5THEN8125
10066 GOTO11010
10085 IFT%<3THENFORI=1TO5:POKE839+I,VAL(MI
D$(A$(T%),I,1)):NEXT
10086 PRINT:GOTO2018
10090 FORE=1TO5:U(E)=PEEK(839+E):NEXT
10100 PRINT"■■■":GOSUB30500:PRINT
10110 REM
10120 PP=PP+(TI-TT)
10980 IFQ$<>"3"THEN11000
10985 A$(T%)="":FORI=1TO5:A$(T%)=A$(T%)+RI
GHT$(STR$(PEEK(839+I)),1):NEXT
10990 BB$=A$(T%):GOTO3030
11000 INPUT"■■■■";B%(T%),R$:R=VAL(R$):C%(T
%)=R:GOSUB30070
11002 TT=TI
11003 U(6)=C%(T%):FORE=1TO6:POKE(1013+6*T%
+E),U(E):NEXT:POKE832,T%*6-1
11005 D%(T%)=B%(T%)+C%(T%):GOTO2065
11010 IFD%(T%)<5THENT%=T%+1:IFT%<4THEN8030

11014 IFD%(T%)<5THEN12000
11015 RR%=RR%+1:IFRR%=1THENT$=A$(T%)
11020 IFC%(T%)<5THENT%=T%+1:A$(T%)=T$:GOTO
11030
11025 Z=Z+PEEK(1014):POKE1014,Z
11027 PP=INT(PP/60)+PEEK(1016)*60+PEEK(101
7):TT=INT(PP/60):PP=PP-TT*60
11028 POKE1016,TT:POKE1017,PP:GOSUB31000:F
ORI=1TO2000:NEXT:CLR:GOTO57
11030 IFT%=2ANDD%(1)=5ORT%=3ANDD%(1)=0THEN
```

```
9000
11040 GOTO9000
12000 IFS%=0THEN8100
12005 IFF%=2THEN12500
12010 ONW%GOTO12100,12200,12300,12400
12100 OND%(1)GOTO12150
12120 G$="/1111*":GOTO12500
12150 G$="1111*":GOTO12500
12200 OND%(1)GOTO12240,12260
12220 G$="/111*/222*/122*/112*":GOTO12500
12240 G$="111*/111*11/1*1/11*":GOTO12500
12260 G$="111*112*122*":GOTO12500
12300 OND%(1)GOTO12340,12360,12380
12320 G$="/11*/22*/33*/12*/13*/23*":GOTO12
500
12340 G$="11*/11*/22*1/1*1/2*":GOTO12500
12360 G$="11*22*/11*12*1/1*2/1*":GOTO12500
12380 G$="11*12*13*23*22*33*":GOTO12500
12400 OND%(1)GOTO12420,12430,12440,12450
12410 G$="/1*/2*/3*/4*":GOTO12500
12420 G$="1*/1*/2*/3*":GOTO12500
12430 G$="1*2*/1*/2*":GOTO12500
12440 G$="1*2*3*/1*":GOTO12500
12450 G$="1*2*3*4*"
12500 S%=LEN(G$):F$=""
12510 FORM=1TO5
12520 H$=MID$(G$,M,1):IFH$="/"THEN12600
12530 IFH$="*"THENL=M:GOTO12700
12535 Y%=VAL(H$)
12540 F$=F$+MID$(C$,Y%,1):NEXT
12600 FORL=M+1TO8
12610 H$=MID$(G$,L,1):IFH$="*"THEN12700
12620 Y%=VAL(H$)
12630 F$=F$+MID$(D$,Y%,1):NEXT
12700 S%=S%-L:IFS%=0THEN8145
12800 G$=RIGHT$(G$,S%):GOTO8145
13100 M$="01234":RETURN
13200 M$="0102030412131423243 4":RETURN
13300 M$="0120130140230240341231241342 34":
RETURN
13400 M$="0123012401340234 1234":RETURN
13500 M$="01234":RETURN
14100 N$="567":RETURN
```

```
14200 N$="5556576667":RETURN
14300 N$="556557566567667":RETURN
14400 N$="556655675667":RETURN
14500 N$="55667":RETURN
16000 A2%=N%/D1%
16020 FORJ=1TOA2%
16030 A1%(J)=INT(RND(1)*10)+1
16040 IFA1%(J)>A2%THEN16030
16055 FORJJ=0TOJ-1
16060 IFA1%(J)=A1%(JJ)THEN16030
16070 NEXTJJ,J
16080 W$="":FORJ=1TOA2%:A1%(J)=A1%(J)*D1%-
D1%+1
16090 W$=W$+MID$(V$,A1%(J),D1%):NEXT
16100 RETURN
19000 DATA207,34,103,17,180,8,219,43,237,2
1,247,10,39,52,20,26,10,13
20000 DATA234,234,234,234,234,162,1,138,15
7,57,3,232,224,6,208,247,169,0,141
20010 DATA63,3,162,4,138,168,136,189,58,3,
217,58,3,240,27,192,0,208,243,76
20020 DATA151,3,169,0,157,58,3,202,224,0,2
08,10,254,58,3,232,254,58,3,76,100
20030 DATA3,254,58,3,189,58,3,201,6,240,22
6,76,100,3,224,4,208,232,238,63,3,76
20040 DATA166,3,162,4,76,138,3,162,0,232,1
88,57,3,185,66,3,157,71,3,224,5,208
20050 DATA242,234,234,160,255,200,162,0,13
8,141,65,3,189,72,3,217,252,3,208,3
20060 DATA238,65,3,232,200,224,5,208,239,1
73,65,3,201,5,240,16,217,252,3,208
20070 DATA11,204,64,3,208,215,169,1,141,66
,3,96,173,63,3,201,120,208,177,169,2
20080 DATA141,66,3,96,0,0,0,0,0,0
30000 CZ=PEEK(214):DI=37888:CZ=CZ*40+17408
+13:CZ$="99999":ZC=0:CO=8
30005 POKE54272,181:POKE54273,65:POKE54277
,0:POKE54278,240
30010 POKECZ,160:POKECZ+DI,11
30020 GETEI$:IFVAL(EI$)=0THEN30040
30030 CZ$=LEFT$(CZ$,ZC)+EI$+RIGHT$(CZ$,4-Z
C):POKECZ+DI,VAL(EI$)-1
30035 POKE54276,17:CO=VAL(EI$)-1:FORI=1TO1
```

```
00:NEXT:POKE54276,0
30040 IFPEEK(203)=2THENIFPEEK(653)=0THENIF
ZC<4THEN30100:REM RIGHT
30050 IFPEEK(203)=2THENIFPEEK(653)=1THENIF
ZC>0THEN30200:REM LEFT
30052 IFEI$="H"THEN30080
30055 IFPEEK(203)<>1THEN30020
30060 X(0)=VAL(CZ$)-11111:POKECZ,81:POKECZ
+DI,CO
30070 POKE54276,33:FORI=1TO400:NEXT:POKE54
276,0:RETURN
30080 PRINT:PRINT:PRINT"■■■■■■■MY COMBINAT
ION WAS:":PRINT:PRINT
30081 CZ=PEEK(214)*40+17421
30082 FORI=1TO5:CO=VAL(MID$(AA$,I,1)):POKE
CZ+(I-1)*6,81:POKECZ+(I-1)*6+DI,CO
30084 NEXTI:RETURN
30100 POKECZ,81:POKECZ+DI,CO:CZ=CZ+6:CO=PE
EK(CZ+DI):ZC=ZC+1
30110 POKECZ,160:POKECZ+DI,11:GOTO30020
30200 POKECZ,81:POKECZ+DI,CO:CZ=CZ-6:CO=PE
EK(CZ+DI):ZC=ZC-1
30210 POKECZ,160:POKECZ+DI,11:GOTO30020
30500 CZ=PEEK(214):DI=37888:CZ=CZ*40+17408
+13
30505 POKE54272,181:POKE54273,65:POKE54277
,0:POKE54278,240:POKE54296,15
30510 FORI=0TO4
30520 POKECZ+I*6,81:POKECZ+I*6+DI,U(I+1)
30530 POKE54276,17:FORJ=1TO100:NEXTJ:POKE5
4276,0
30550 NEXTI:RETURN
31000 RESTORE:SI=54272:POKESI+24,15:POKESI
+5,10:POKESI+12,10:POKESI+19,10
31010 POKESI+6,175:POKESI+13,175:POKESI+20
,175
31020 FORH=1TO3:RESTORE:FORI=1TO3
31030 READA:POKESI,A:READB:POKESI+1,B:READ
C:POKESI+7,C:READD:POKESI+8,D
31040 READE:POKESI+14,E:READF:POKESI+15,F
31050 POKESI+4,17:POKESI+11,33:POKESI+18,1
7
31060 FORJ=1TO100:NEXTJ
```

```
31070 POKESI+4,0:POKESI+11,0:POKESI+18,0
31080 NEXTI:NEXTH:RETURN
READY.
```

Snake

4

The snake in this game can be controlled via the keyboard or with a joystick. The snake has to gobble the hearts which are placed randomly on the screen. The score you will get for each heart is determined randomly also. If you reach a certain score you get a bonus round.
The following events will stop the game :

1. The snake bites itself
2. The snake hits a wall
3. The snake moves backward
4. The time is over

```
5 PRINT"♥QQQQQQQQQQQQQ]]]]]]]   S N A K E
G A M E"
7 FORI=1TO2000:NEXT
10 DIMS(400)
11 GOSUB50000:JO=1
12 PRINT"♥QQQQ]]JOYSTICK CONNECTED (Y/N)?
"
13 GETA$:IFA$=""THEN13
14 IFA$="Y"THENJO=2
15 PRINT"♥":DI=54272:POKE53280,8:POKE53281
,8
16 SI=54272:POKESI+24,15
17 POKESI+5,0:POKESI+12,0:POKESI+19,0
18 POKESI+6,240:POKESI+13,240:POKESI+20,24
0
19 POKESI+1,30:POKESI+8,20
20 POKESI+18,33:FORI=1TO40:POKESI+15,I*4
30 POKE1144+I-1,102:POKE1144+I-1+DI,1
40 POKE1984+I-1,102:POKE1984+I-1+DI,1
```

```
50 NEXT:POKESI+18,0
60 POKESI+18,33:FORI=1TO25:POKESI+15,I*10
70 POKE1024+(I-1)*40,102:POKE1024+(I-1)*40
+DI,1
80 POKE1063+(I-1)*40,102:POKE1063+(I-1)*40
+DI,1
90 NEXT:POKESI+18,0
100 PRINTTAB(2)"■SCORE"
110 PRINTTAB(2)"■TOTAL"TAB(20)"GAMES"
500 PU=0:BB=0:Q=0:SP=6:BO=2400
600 PRINT"■"
610 PRINT
611 PRINTTAB(9)"      "
612 PRINT"■■"
620 PRINTTAB(9)PUTAB(27)SP-BB
625 PRINT"■"TAB(27)SP-BB
628 LL=10
630 PRINT"■"
635 PRINT"■■"
640 FORI=1TO20
650 PRINT"■■
      "
660 NEXT:POKESI+18,17:POKESI+4,17
670 FORI=0TO39:POKESI+15,I*5:POKE1024+I,83
:POKE1024+I+DI,2:NEXT
675 POKESI+18,0:POKESI+4,0
680 QW=39
700 A=1524:X=-1:Q=0:G=0:TI$="000000"
800 GOSUB10000
900 PRINT"■":PRINT:PRINTTAB(9)PUTAB(27)SP-
BB
1010 IFPEEK(A)<>32THEN20000
1020 POKESI+4,17
1030 POKEA,87:POKEA+DI,6:G=G+1:IFG>18THENP
OKES(G-18),32
1035 POKESI+4,0
1040 IFG=18THENPOKE1524,32
1050 ONJOGOTO1100,1055
1055 JY=PEEK(56320):IFJY=64THEN1200
1060 IFJY=126THENX=-40:GOTO1200
1065 IFJY=123THENX=-1:GOTO1200
1070 IFJY=125THENX=40:GOTO1200
1075 IFJY=119THENX=1:GOTO1200
```

```
1100 GETA$:IFA$=""THEN1200
1110 IFA$="Q"THENX=-40:GOTO1200
1120 IFA$=","THENX=-1:GOTO1200
1130 IFA$="A"THENX=40:GOTO1200
1140 IFA$="."THENX=1
1200 Q=Q+1:IFQ=400THEN30000
1300 S(Q)=A
1310 IFQ=LLTHENPOKESI+11,17:POKE1024+QW,32
:QW=QW-1:LL=LL+10:POKESI+11,0
1400 A=A+X:IFTI>300-ZA/100THENTI$="000000"
:POKEZ,32:GOSUB10000
1500 GOTO1010
10000 ZA=INT(8*RND(1)+1)*100
10010 Z=INT(840*RND(1))+1185
10030 IFPEEK(Z)<>32THEN10010
10040 PRINT"■":PRINTTAB(9)"      ":PRINT"■
":PRINTTAB(9)ZA
10050 POKESI+11,33:POKEZ,83:POKEZ+DI,2
10060 POKESI+11,0:RETURN
20000 IFPEEK(A)<>83THEN30000
20050 POKEZ,87:POKEZ+DI,6
20100 FORII=1TO70:POKESI+18,0
20105 LA=INT(255*RND(1)):POKEZ,LA:POKEZ+DI
,INT(RND(1)*16)
20107 POKESI+15,LA:POKESI+18,129:NEXTII
20110 PRINT"■":POKESI+18,0
20115 PRINTTAB(9)"     ":PRINTTAB(9)"
  "
20118 PRINT"■"
20120 PRINTTAB(9)"     "
20130 PRINTTAB(9)PU+ZA
20140 PU=PU+ZA
20145 POKEZ,87:POKEZ+DI,8
20150 IFPU>BOTHENSP=SP+2:BO=PU+1500:GOSUB6
3000
20200 BB=BB+1
20250 IFBB=SPTHEN40000
20255 FORI=1TO200:GETA$:NEXT
20300 GOTO600
23000 PRINTPEEK(56320):GOTO23000
30000 POKESI+18,17:FORI=80TO1STEP-1:POKESI
+15,I:NEXT:POKESI+18,0
```

```
30010 PRINT"■":PRINTTAB(9)"        ":PRINTTA
B(9)"        "
30020 PRINT"■":PRINTTAB(9)"      "
30030 PRINTTAB(9)PU-ZA
30040 PU=PU-ZA:BB=BB+1
30050 IFBB=SPTHEN40000
30060 FORI=1TO200:GETA$:NEXT
30070 GOTO600
40000 IFPU>HE(1)ORPU>HE(2)ORPU>HE(3)THENGO
SUB63100
40010 IFPU>HE(1)THENHE(3)=HE(2):HE$(3)=HE$
(2):HE(2)=HE(1):HE$(2)=HE$(1)
40020 IFPU>HE(1)THENPRINT"□":PRINT"■■■■■■■■
ENTER YOUR NAME "
40025 IFPU>HE(1)THENHE(1)=PU:INPUTHE$(1):G
OTO41000
40030 IFPU>HE(2)THENHE(3)=HE(2):HE$(3)=HE$
(2):PRINT"□":PRINT"■■■■■■■■ENTER NAME "
40040 IFPU>HE(2)THENHE(2)=PU:INPUTHE$(2):G
OTO41000
40050 IFPU>HE(3)THENPRINT"□":PRINT"■■■■■■■■
ENTER NAME":HE(3)=PU:INPUTHE$(3)
41000 PRINT"□":PRINT:PRINT:PRINT
41010 PRINTTAB(3)HE$(1)TAB(25)HE(1)
41020 PRINT:PRINTTAB(3)HE$(2)TAB(25)HE(2)
41030 PRINT:PRINTTAB(3)HE$(3)TAB(25)HE(3)
41040 PRINT:PRINT:PRINT
41050 PRINT"AGAIN ?  (Y/N)"
41055 FORI=1TO10:GETA$:NEXT
41060 GETA$:IFA$=""THEN41060
41070 IFA$="Y"THEN15
41080 IFA$<>"N"THEN41060
41090 POKE59466,0:POKE59467,0
41100 END
50000 POKE59458,238
50010 POKE59468,14
50020 PRINT"□■■■DO YOU KNOW THE RULES ?
50025 PRINT"■(Y/N)?
50030 FORI=1TO10:GETA$:NEXT
50040 GETA$:IFA$=""THEN50040
50050 IFA$<>"N"THEN50200
50060 PRINT"□YOU HAVE TO HUNT FOR YOUR VIC
TIM
```

```
50065 PRINT"WITH A SNAKE. THE SNAKE IS CON
TROLLED
50070 PRINT"WITH < FOR LEFT, > FOR RIGHT,
50075 PRINT"Q FOR UP, AND A FOR DOWN.
50080 PRINT"THE VICTIM IS SHOWN AS A HEART

50090 PRINT"IF YOU HIT THE HEART, YOU GET
THE
50095 PRINT"SCORE DISPLAYED IN THE UPPER R
IGHT-
50100 PRINT"HAND CORNER OF THE SCREEN.
50105 PRINT"IF YOU HIT THE WALL OR THE BAC
K OF
50110 PRINT"THE SNAKE, THEN THIS NUMBER IS

50115 PRINT"DEDUCTED FROM YOUR SCORE. THE
TIME
50120 PRINT"AVAILABLE PER ROUND IS DISPLAY
ED BY
50125 PRINT"THE HEARTS IN THE UPPER LINE.
50130 PRINT"IF THIS LINE IS DOWN TO ZERO,
THE
50135 PRINT"NUMBER OF HEARTS IS DEDUCTED F
ROM YOUR
50140 PRINT"SCORE. IF YOU REACH A SCORE OF
 MORE
50145 PRINT"THAN 2400 DURING THE SIX ROUND
S AVAI-
50150 PRINT"LABEL, THEN YOU GET TWO MORE R
OUNDS.
50155 PRINT"FOR EACH ADDITIONAL SCORE OF 1
000
50160 PRINT"YOU GET ANOTHER TWO BONUS ROUN
DS.
50170 PRINT"■■PRESS ANY KEY WHEN READY
50180 FORI=1TO10:GETA$:NEXT
50190 GETA$:IFA$=""THEN50190
50200 POKE59468,12
50210 RETURN
63000 FORI=1TO3
63010 FORJ=1TO3
63030 READA1,A2,A3,Z1
63040 POKESI+1,A1:POKESI+8,A2:POKESI+15,A3
```

```
63050 POKESI+4,17:POKESI+11,17:POKESI+18,1
7
63055 PRINT"SQ]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]
  BONUS"
63060 FORK=1TOZ1:NEXTK
63070 POKESI+4,0:POKESI+11,0:POKESI+18,0
63075 PRINT"SQ]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]]
      "
63080 NEXTJ:RESTORE:NEXTI
63090 POKESI+1,30:POKESI+8,20
63100 RETURN
63200 DATA34,17,8,70,43,21,10,70,52,26,13,
200
```

Super Sprite Editor

5

This is not just another sprite editor. This super sprite editor offers you the following :

1. Normal and multicolor sprites
2. Use of joystick for definition of sprite
3. Definitions of colors
4. Change sprite and background colors at any time
5. Grid behind sprite possible (on/off)
6. The actual sprite can be seen at the same time as the enlarged model
7. Enlarge sprite in X- and/or Y-direction
8. Save and load sprites from disk or cassette
9. Display of the sprite data at any time
10. Output of sprite and data to VIC 1525 printer
11. Grid and multicolors (as shades) can be printed on the printer
12. Sprite can be mirrored in all directions.

To draw a sprite move the cursor to the desired location and press the red fire button until you got the desired color. To erase just write in the background color. The actual sprite is shown in the bottom right hand corner. The selected colors are shown in the upper right hand corner. The colors may be changed at any time by pressing the function keys to the right of the keyboard. The default colors are :

```
background   = gray 2
screen color = black
MC 1         = black
MC 2         = black
```

If you change the background color, only the background of the actual sprite and the definition sprite will change, while the rest of the screen does not change, so that the text remains readable. You may turn on a grid behind the definition sprite by pressing 'G'. To remove the grid press 'SHIFT-G'.

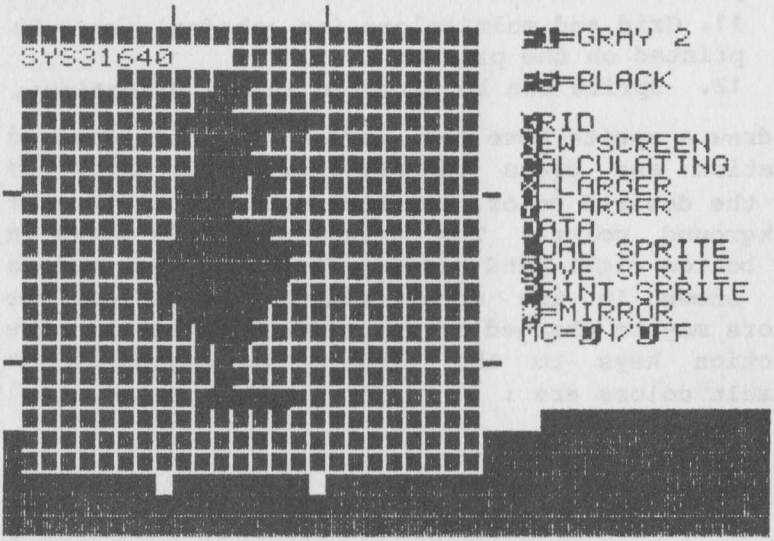
To enlarge the actual sprite in direction X or Y press 'X' or 'Y'. To get back to normal size press 'SHIFT-X' or 'SHIFT-Y'.

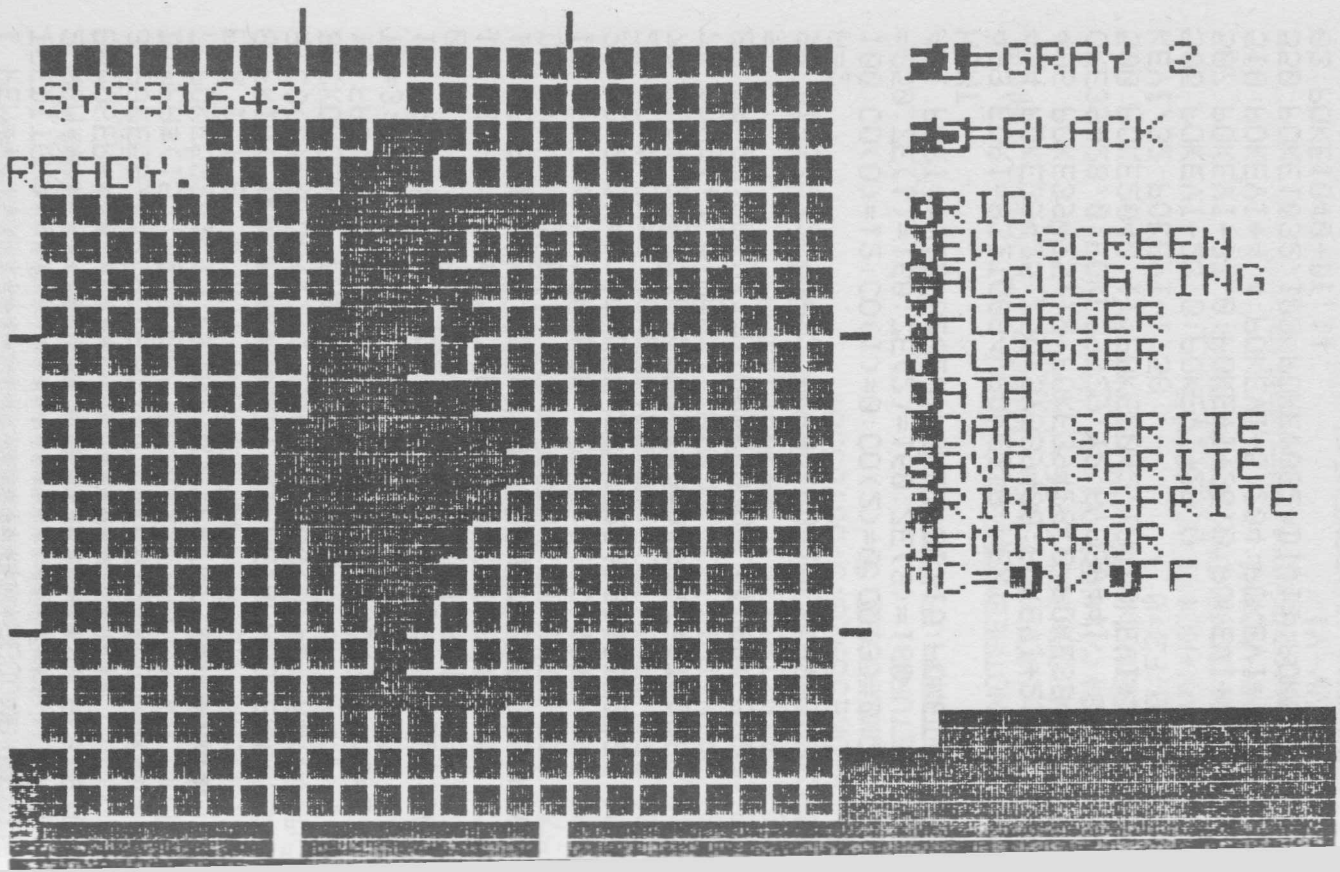
Once you have defined a sprite you can save it on disk or cassette. The colors and the other settings will be saved too, so when you later load it, you will be in the same modes as when you saved it.

To get the data defining your present sprite, press 'D'. The data will overwrite the menu. To get back to the menu, press 'SHIFT-D'.

You may print the sprite on a printer hooked up to your computer. If the grid is turned on, it will also be printed. If you are in multicolor mode, the different colors will be printed as different shades.

The sprite may be mirrored on the X-axis, the Y-axis, or on the center point.




SYS31643
READY.
1=GRAY 2
15=BLACK
GRID
NEW SCREEN
CALCULATING
X-LARGER
Y-LARGER
DATA
LOAD SPRITE
SAVE SPRITE
PRINT SPRITE
*=MIRROR
MC=ON/OFF

```
1 REM**************************ELCOMP SPRI
TEEDITOR*****************************
2 REM*****************************BY R. HEIG
ENMOSER******************************
3 POKE56,147:POKE52,147:VI=53248:DIMA(64):
DIMFA$(15):R2=250
7 POKE53281,15:PRINT"■":PRINT"■■■■■■■■S
P R I T E  E D I T O R
8 PRINT"■■■■■■■■■■■■BY R. HEIGENMOSER"
9 CO(0)=0:CO(1)=1:CO(2)=2:CO(3)=3:FA$(0)="
BACKGROUND":FA$(1)="COLOR 1"
10 FA$(2)="COLOR 2":FA$(3)="COLOR 3":MC=2:
TA=3:PRINT:PRINT:GOSUB561
11 PRINT:PRINT"■HIT ANY KEY !■■":GOSUB150
00
12 GETA$:IFA$=""THEN12
13 POKEVI+21,0:PRINT"■":INPUT"MULTICOLORMO
DE (Y/N) ";MC$
15 IFMC$<>"Y"THEN25
20 MC=2:CM=1:POKEVI+28,4:R2=160:GOTO70
25 MC=1:CM=2:POKEVI+28,0
70 FORI=39977TO40777STEP40:FORJ=0TO23
75 POKEI+J,0:NEXTJ,I
80 TA=27:PRINT"■":POKE53280,14:POKE53281,1
5
90 DI=54272:VX=32:VY=58:PO=1065:HY=38912:F
A=2
100 CO(0)=12:CO(1)=0:CO(2)=0:CO(3)=0:ZE(0)
=250:ZE(1)=160:ZE(2)=160:ZE(3)=160
491 FORI=1812TO2023:POKEI+DI,15:POKEI,160:
NEXT
493 FORI=832TO894:POKEI,0:NEXT
494 POKE39425,250:SYS39430:POKEVI+21,5
496 POKE39425,12:POKE39426,0:POKE39427,0:P
OKE39428,0:POKE39429,12:SYS39441
500 POKE2040,11:POKE2042,13:POKEVI+39,0:PO
KEVI,32:POKEVI+1,58
505 POKEVI+23,0:POKEVI+29,0
507 POKEVI+37,0:POKEVI+38,0:POKEVI+41,0
510 POKEVI+4,4:POKEVI+5,204:POKEVI+16,4
550 POKE1032,103:POKE1032+DI,11:POKE1040,1
03:POKE1040+DI,11
```

```
552 POKE1344,111:POKE1344+DI,0:POKE1664,11
1:POKE1664+DI,0
554 POKE1912,103:POKE1912+DI,11:POKE1920,1
03:POKE1920+DI,11
556 POKE1369,111:POKE1369+DI,0:POKE1689,11
1:POKE1689+DI,0:GOSUB560:GOTO600
560 PRINT"■"
561 PRINTTAB(TA)"■F1■="FA$(CO(0)):IFMC=2
THEN563
562 PRINTTAB(TA)"              ":GOTO564
563 PRINTTAB(TA)"■F3■="FA$(CO(1))
564 PRINTTAB(TA)"■F5■="FA$(CO(2))
565 IFMC=2THEN568
566 PRINTTAB(TA)"              ":GOTO570
568 PRINTTAB(TA)"■F7■="FA$(CO(3))
570 PRINTTAB(TA)"■G■ORID"
572 PRINTTAB(TA)"■N■EW SCREEN"
574 PRINTTAB(TA)"■C■ALCULATING"
576 PRINTTAB(TA)"■X■-LARGER"
578 PRINTTAB(TA)"■Y■-LARGER"
580 PRINTTAB(TA)"■D■ATA"
582 PRINTTAB(TA)"■L■OAD SPRITE"
584 PRINTTAB(TA)"■S■AVE SPRITE"
586 PRINTTAB(TA)"■P■RINT SPRITE"
587 PRINTTAB(TA)"■*■=MIRROR"
588 PRINTTAB(TA)"MC=■O■N/■O■FF":IFMC=2
THENPOKE55926,5:GOTO590
589 POKE55930,5
590 RETURN
600 GETWA$:IFWA$<>""THENGOSUB2000:PRINT"■"

605 JO=NOTPEEK(56320)AND31
610 Y1=-(JOAND1):Y2=(JOAND2)/2:X1=-(JOAND4
)/4:X2=(JOAND8)/8:FE=(JOAND16)/16
612 X1=8*(X1+X2):Y1=8*(Y1+Y2)
614 IFABS(X1)+ABS(Y1)=0THEN655
616 F1=0:F2=0
620 VX=VX+MC*X1:VY=VY+Y1
630 IFVX<224ANDVX>24THEN635
632 VX=VX-MC*X1
635 IFVY<226ANDVY>50THEN640
637 VY=VY-Y1
640 POKEVI,VX:POKEVI+1,VY
```

```
650 PO=1065+(VX-32)/8+40*((VY-58)/8)
655 IF(PEEK(PO+DI)AND15)=0THENPOKEVI+39,1:
GOTO660
656 POKEVI+39,0
660 IFFE<>1THEN670
665 FORI=0TOMC-1:POKEPO+I,ZE(FA):POKEPO+DI
+I,CO(FA):POKEPO+HY+I,FA:NEXT
667 ZE=(VX-32)/8:BI=ZE-INT(ZE/8)*8:BY=(VY-
58)*.375+INT(ZE/8)
668 POKE39568,FA:POKE39569,BY:POKE39570,BI
:SYS39580
670 IFJO<>16THEN680
675 F1=1:IFF2=1THENFA=FA+CM:F1=0:F2=0:IFFA
=4THENFA=0
680 IFJO=0THENIFF1=1THENF2=1
700 GOTO600
2000 SYS37700:IFPEEK(38410)=0THEN2005
2002 POKE38409,MC-1:SYS39441:GOSUB2150:RET
URN
2005 PRINT"■":IFWA$<>"■"THEN2030
2010 CO(0)=CO(0)+1:IFCO(0)=16THENCO(0)=0
2020 POKE39425,CO(0):POKE39429,CO(0):SYS39
441:PRINT"■":PRINTTAB(30)FA$(CO(0))
2025 RETURN
2030 IFWA$<>"■"THEN2060
2040 CO(1)=CO(1)+1:IFCO(1)=16THENCO(1)=0
2050 POKE39426,CO(1):SYS39441:POKEVI+37,CO
(1)
2055 PRINT"■■":PRINTTAB(30)FA$(CO(1)):RETU
RN
2060 IFWA$<>"■"THEN2090
2070 CO(2)=CO(2)+1:IFCO(2)=16THENCO(2)=0
2080 POKE39427,CO(2):SYS39441:POKEVI+41,CO
(2)
2085 PRINT"■■■":PRINTTAB(30)FA$(CO(2)):RET
URN
2090 IFWA$<>"■"THEN2120
2100 CO(3)=CO(3)+1:IFCO(3)=16THENCO(3)=0
2110 POKE39428,CO(3):SYS39441:POKEVI+38,CO
(3)
2115 PRINT"■■■■":PRINTTAB(30)FA$(CO(3)):RE
TURN
2120 IFWA$<>"G"THEN2140
```

```
2130 POKE39425,250:FORI=39426TO39428:POKEI
,160:NEXT:SYS39430
2132 POKE55523,5:ZE(0)=250
2135 FORI=0TO3:POKE39425+I,CO(I):NEXT:RETU
RN
2140 IFWA$<>"|"THEN2160
2150 FORI=39425TO39428:POKEI,160:NEXT:SYS3
9430
2152 POKE55523,2:ZE(0)=160
2155 FORI=0TO3:POKE39425+I,CO(I):NEXT:RETU
RN
2160 IFWA$<>"N"THEN2210
2170 PRINT"■■NEW SCREEN ?■"
2180 GETA$:IFA$=""THEN2180
2190 IFA$="Y"THENPRINT"■    ■OK■
 ":GOTO13
2195 PRINT"■          ■|          |  ":RETURN
2210 IFWA$="X"THENPOKEVI+29,4:POKE55643,5:
RETURN
2220 IFWA$="+"THENPOKEVI+29,0:POKE55643,2:
RETURN
2230 IFWA$="Y"THENPOKEVI+23,4:POKE55683,5:
RETURN
2240 IFWA$=" |"THENPOKEVI+23,0:POKE55683,2:
RETURN
2250 IFWA$="D"THENGOSUB3500:RETURN
2255 IFWA$<>"¬"THEN2260
2256 GOSUB3800:POKEVI+23,0:POKEVI+29,0:GOS
UB560
2257 POKEVI+21,5:FORI=1813TO2013STEP40:FOR
J=0TO6:POKEI+J,160:NEXTJ,I
2258 GOSUB2150:RETURN
2260 IFWA$<>"L"THEN2350
2265 PRINT"■■LOAD SPRITE ?■
  "
2270 GETA$:IFA$=""THEN2270
2271 IFA$<>"Y"THEN2310
2272 POKEVI+21,1:POKEVI+23,0:POKEVI+29,0:I
NPUT"■■NAME OF SPRITE: ";N$
2273 INPUT"■CASSETTE/DISKETTE (C/D) ";SP$
2274 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■■":IFSP$="C"T
HENOPEN1,1,0,N$:GOTO2287
2276 IFSP$="D"THENOPEN1,8,2,N$+",S,R":GOTO
2287
```

```
2278 GOTO2273
2287 REM
2288 POKE55763,5
2290 INPUT#1,MC:FORX=1TO63:INPUT#1,A(X):NE
XT:IFSP$="D"THEN2300
2295 PRINT"╥┐              |            |        ":PR
INT"                          "
2300 CLOSE1:GOSUB5000:SYS39441:GOSUB2150:G
OSUB560:POKE55763,2:POKE55523,2
2310 PRINT"▒                   ▣|            |
   "
2320 RETURN
2350 IFWA$<>"S"THEN2500
2360 PRINT"▒▒▒SAVE SPRITE ?▀"
   "
2370 GETA$:IFA$=""THEN2370
2380 IFA$<>"Y"THEN2470
2385 INPUT"▒▒NAME OF SPRITE: ";N$
2390 INPUT"▒CASSETTE/DISKETTE (C/D) ";SP$
2392 POKE55803,5
2395 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒":IFSP$="C"
THENOPEN1,1,1,N$:GOTO2440
2400 IFSP$="D"THENOPEN1,8,2,N$+",S,W":GOTO
2440
2410 GOTO2390
2440 PRINT#1,MC:FORX=1TO63:PRINT#1,PEEK(83
1+X):NEXT
2450 CLOSE1:IFSP$="D"THEN2470
2460 PRINT"╥┐              |            |        ":
PRINT"                                     "
2470 PRINT"▒                   ▣|            |
   "
2480 POKE55803,2:RETURN
2500 IFWA$<>"P"THEN2600
2505 POKE55843,5:X=0:FORI=1TO63:A(I)=PEEK(
831+I):NEXT
2507 IFZE(0)=250THENGI=186:GOTO2510
2508 GI=32
2510 OPEN4,4
2512 KO$(1)=CHR$(145)+"______________________
________"+CHR$(8)
2513 KO$(2)=CHR$(15)+CHR$(145)+" ___________
_____________________"+CHR$(17)+CHR$(15)
```

```
2514 PRINT#4,KO$(1)
2515 FORI=39977TO40777STEP40::PR$=CHR$(15)
+CHR$(145)+" "+CHR$(15):ZA$=""
2517 FORJ=0TO23
2520 IFPEEK(I+J)=0THENPR$=PR$+CHR$(146)+CH
R$(GI):GOTO2535
2530 IFPEEK(I+J)=2THENPR$=PR$+CHR$(18)+CHR
$(32):GOTO2535
2531 IFPEEK(I+J)=1THENPR$=PR$+CHR$(166):GO
TO2535
2532 IFPEEK(I+J)=3THENPR$=PR$+CHR$(191)
2535 NEXTJ
2537 ZA$=ZA$+CHR$(146)
2540 FORK=1TO3:ZA$=ZA$+CHR$(16)+RIGHT$(STR
$(K*4+40),2)+STR$(A(X+K)):NEXTK:X=X+3
2550 PR$=PR$+CHR$(146)+CHR$(145)+"| "+CHR$(
15)+ZA$+CHR$(8):PRINT#4,PR$:NEXTI
2560 PRINT#4,KO$(2):PRINT#4,CHR$(15)
2570 PRINT#4,CHR$(18)" "CHR$(146)" =SCR"
2572 PRINT#4,CHR$(166)" =SMC #0"
2574 PRINT#4,CHR$(191)" =SMC #1"
2576 CLOSE4
2580 POKE55843,2:RETURN
2600 IFWA$<>"*"THEN2700
2605 POKE55883,5
2610 INPUT"X-/Y-AXIS/POINTSYMM. (X/Y/P)";
SP$:POKE38409,MC-1
2620 IFSP$="X"THENSYS38500:GOTO2650
2625 IFSP$="P"THENSYS38500:SYS38700:GOTO26
50
2630 IFSP$="Y"THENSYS38700:GOTO2650
2640 GOTO2610
2650 SYS39441:GOSUB2150
2660 PRINT"
    ":POKE55883,2:POKE55603,2:RETURN
2700 RETURN
3500 REM DATA
3510 POKE55723,5:POKE55603,5:POKEVI+21,1:G
OSUB3800
3515 FORI=1TO63:A(I)=PEEK(831+I):NEXT
3520 PRINT"":FORI=0TO20:PRINT
3530 FORJ=0TO2:PRINT"";TAB(26+J*4)A(I*3+J
+1):NEXTJ
```

```
3540 NEXTI:POKE55723,2:POKE55603,2:RETURN
3800 REM CLEAR MENU
3810 PRINT"■":FORI=1TO23:PRINTTAB(26)"
          ":NEXT:RETURN
5000 REM DISPLAY SPRITE LOADED
5005 POKE55603,5:FORI=1TO63:POKE831+I,A(I)
:NEXT
5007 POKEVI,32:POKEVI+1,58:VX=32:VY=58:PO=
1065:FA=2
5010 IFMC=2THENCM=1:POKEVI+28,4:GOTO5500
5015 CM=2:POKEVI+28,0:POKE55930,5:POKE5592
6,2
5020 X=0:FORI=39977TO40777STEP40:FORJ=7TO3
0STEP8:X=X+1:FORK=7TO0STEP-1
5030 BI=((A(X)AND(2↑K))/2↑K):POKEI+J-K,BI*
2:A(X)=A(X)-BI*2↑K:NEXTK,J,I
5040 GOTO5600
5500 POKE55930,2:POKE55926,5
5505 X=0:FORI=39977TO40777STEP40:FORJ=7TO3
0STEP8:X=X+1:FORK=7TO0STEP-2
5510 BI=(A(X)AND(2↑K+2↑(K-1)))/(2↑(K-1)):P
OKEI+J-K,BI:POKEI+J-K+1,BI
5520 A(X)=A(X)-BI*2↑(K-1)
5530 NEXTK,J,I
5600 POKEVI+41,CO(2):POKEVI+37,CO(1):POKEV
I+38,CO(3):POKEVI+21,5
5610 POKE55603,2:RETURN
6000 REM CALCULATE DATA
6010 IFMC=2THEN6500
6020 BI=0:X=0:FORI=39977TO40777STEP40:FORJ
=7TO30STEP8:X=X+1:FORK=7TO0STEP-1
6030 BI=BI+(PEEK(I+J-K)/2)*(2↑K):NEXTK
6040 A(X)=BI:BI=0:NEXTJ,I:RETURN
6500 BI=0:X=0:FORI=39977TO40777STEP40:FORJ
=7TO30STEP8:X=X+1:FORK=7TO0STEP-2
6510 BI=BI+PEEK(I+J-K)*(2↑(K-1)):NEXTK
6520 A(X)=BI:BI=0:NEXTJ,I:RETURN
9000 DATABLACK    ,WHITE    ,RED      ,CYA
N      ,PURPLE   ,GREEN    ,"BLUE    "
9010 DATAYELLOW   ,ORANGE   ,BROWN    ,LT
RED    ,GRAY 1   ,GRAY 2   ,LT GREEN
9020 DATALT BLUE  ,"GRAY 3    "
10000 DATA195,0,0,231,0,0,126,0,0,60,0,0,6
```

```
0,0,0,126,0,0,231,0,0,195,0,0
11000 REM SUBROUTINE GRID/COLOR
11010 DATA169,4,133,140,169,41,133,139,76,
25,154,169,216,133,140,169
11020 DATA41,133,139,169,156,133,142,169,4
1,133,141,162,0,160
11030 DATA0,161,141,170,189,1,154,162,0,12
9,139,200,230,139,230
11040 DATA141,208,4,230,140,230,142,192,24
,208,231,160,0,24,165
11050 DATA139,105,16,133,139,133,141,144,4
,230,140,230,142,165,142,201,159
11060 DATA208,208,165,141,201,113,208,202,
234
11100 DATA162,0,160,0,169,21,133,139,169,2
19,133,140,234,234,234
11110 DATA234,234,234,234,234,234,234,234,
234,173,5,154,129,139,200,230,139
11120 DATA192,7,208,244,160,0,24,165,139,1
05,33,133,139,144,233,96
11200 DATA234,234,234,234
11205 DATA0,0,0,0,128,64,32,16,8,4,2,1,24,
174,145,154,172,146,154
11210 DATA169,0,141,147,154,173,28,208,240
,7,238,147,154
11220 DATA46,144,154,200,238,147,154,110,1
44,154,185,148,154
11230 DATA24,110,144,154,176,8,73,255,61,6
4,3,76,206,154
11240 DATA29,64,3,157,64,3,206,147,154,240
,4,136,76,186,154,96
11300 REM MIRROR X
11310 DATA169,40,133,139,169,156,133,140,1
69,72,133,141,169,159,133,142,162
11320 DATA10,160,24,177,139,141,11,150,177
,141,145,139,173,11,150,145,141,136
11330 DATA208,239,165,139,24,105,40,133,13
9,144,2,230,140,165,141,56,233,40
11340 DATA133,141,176,2,198,142,160,24,202
,208,212,169,63,133,139,169,3,133,140
11350 DATA133,142,169,123,133,141,160,3,16
2,10,177,139,141,11,150,177,141,145
```

```
11360 DATA139,173,11,150,145,141,136,208,2
39,165,139,24,105,3,133,139,165
11370 DATA141,56,233,3,133,141,160,3,202,2
08,220,96
11400 REM MIRROR Y
11410 DATA169,40,133,139,169,156,133,140,1
33,142,169,53,133,141,169,21,141
11420 DATA15,150,160,12,162,0,177,139,141,
11,150,161,141,145,139,173,11,150
11430 DATA129,141,136,240,14,24,165,141,10
5,1,133,141,144,2,230,142,76,67,151
11440 DATA160,12,206,15,150,240,29,165,139
,24,105,40,133,139,144,2,230,140
11450 DATA165,140,133,142,165,139,24,105,1
3,133,141,144,2,230,142,76,67,151
11460 DATA169,63,133,139,169,3,133,140,169
,21,141,15,150,162,8,160,3,177
11470 DATA139,141,16,150,169,0,141,17,150,
24,173,9,150,208,63,173,16,150,106
11480 DATA141,16,150,173,17,150,42,141,17,
150,202,208,239,162,8,173,17,150
11490 DATA153,10,150,136,208,212,160,3,173
,11,150,145,139,136,173
11500 DATA12,150,145,139,136,173,13,150,14
5,139,206,15,150,208,1,96,165,139
11510 DATA24,105,3,133,139,76,147,151,173,
16,150,106,106,141,16,150,173,17
11520 DATA150,42,141,17,150,173,16,150,10,
173,17,150,42,141,17,150,202
11530 DATA202,208,226,76,184,151
11600 REM MOVEMENT
11610 DATA169,1,141,10,150,165,203,201,7,2
40,10,201,2,240,14,169,0,141,10
11620 DATA150,96,173,141,2,240,14,76,216,1
47,173,141,2,240,3,76,68,148,76
11630 DATA205,148,169,32,133,139,169,72,13
3,141,169,159,133,140,133,142,162,20
11640 DATA160,24,177,139,145,141,136,208,2
49,165,140,133,142,165,139,133
11650 DATA141,56,233,40,133,139,176,2,198,
140,160,24,202,208,227,162,24,169
11660 DATA0,157,40,156,202,208,250,169,120
,133,139,169,123,133,141,169,3
```

```
11670 DATA133,140,133,142,160,3,162,20,177
,139,145,141,136,208,249,165,139
11680 DATA133,141,56,233,3,133,139,160,3,2
02,208,235,169,0,141,64,3,141,65
11690 DATA3,141,66,3,96,169,80,133,139,169
,40,133,141,169,156,133,140,133,142
11700 DATA162,20,160,24,177,139,145,141,13
6,208,249,165,140,133,142,165,139
11710 DATA133,141,24,105,40,133,139,144,2,
230,140,160,24,202,208,227,162,24
11720 DATA169,0,157,72,159,202,208,250,169
,66,133,139,169,63,133,141,169,3,133
11730 DATA140,133,142,160,3,162,20,177,139
,145,141,136,208,249,165,139,133
11740 DATA141,24,105,3,133,139,160,3,202,2
08,235,169,0,141,124,3,141,125,3
11750 DATA141,126,3,96,169,42,133,139,169,
41,133,141,169,156,133,140,133
11760 DATA142,160,0,162,21,169,1,141,15,15
0,173,9,150,240,5,169,2,141,15,150
11770 DATA177,139,145,141,200,192,23,208,2
47,136,169,0,145,139,160,0,206,15
11780 DATA150,208,235,165,139,24,105,40,13
3,139,144,2,230,140,165,141,24,105
11790 DATA40,133,141,144,2,230,142,202,208
,195,169,63,133,139,169,3,133
11800 DATA140,169,21,141,15,150,162,1,173,
9,150,240,2,162,2,160,3,24,177,139
11810 DATA10,145,139,136,177,139,42,145,13
9,136,177,139,42,145,139,202,208,233
11820 DATA165,139,24,105,3,133,139,206,15,
150,208,212,96,169,40,133,139,169
11830 DATA41,133,141,169,156,133,140,133,1
42,160,23,162,21,169,1,141,15,150
11840 DATA173,9,150,240,5,169,2,141,15,150
,177,139,145,141,136,208,249,200
11850 DATA169,0,145,139,160,23,206,15,150,
208,237,165,139,24,105,40,133,139
11860 DATA144,2,230,140,165,141,24,105,40,
133,141,144,2,230,142,202,208,197
11870 DATA169,63,133,139,169,3,133,140,169
,21,141,15,150,162,1,173,9,150,240
11880 DATA2,162,2,160,1,24,177,139,74,145,
```

```
139,200,177,139,106,145,139,200
11890 DATA177,139,106,145,139,202,208,233,
165,139,24,105,3,133,139,206,15
11900 DATA150,208,212,96
15000 FORI=0TO15:READFA$(I):NEXT
15010 B=0:FORI=704TO727:READA:B=B+A:POKEI,
A:NEXT
15015 IFB<>1224THENPRINT"■ERROR LINE 10000
":STOP
15020 B=0:FORI=39430TO39642:READA:B=B+A:PO
KEI,A:NEXT
15025 IFB<>28531THENPRINT"■ERROR LINE 1100
0-11240":STOP
15030 B=0:FORI=38500TO38618:READA:B=B+A:PO
KEI,A:NEXT
15040 IFB<>15487THENPRINT"■ERROR LINE 1131
0-11370":STOP
15050 B=0:FORI=38700TO38918:READA:B=B+A:PO
KEI,A:NEXT
15060 IFB<>25446THENPRINT"■ERROR LINE 1141
0-11530":STOP
15100 B=0:FORI=37700TO38227:READA:B=B+A:PO
KEI,A:NEXT
15110 IFB<>66428THENPRINT"■ERROR LINE 1161
0-11900":STOP
15500 RETURN
READY.
```

Landing Simulator

6

In this game the landing (final approach) of a small plane is simulated. You have a choice of realtime or delayed time operation.
The following meters are available :

1. Altitude
2. Speed
3. Artificial horizon
4. Calculated touch down point
5. Landing flap position

After landing or crashing you will get a diagram of your landing curve.

```
90 SI=54272:POKESI,39:POKESI+1,52:POKESI+5
,0:POKESI+6,240:POKESI+24,15
100 DIMFR(41):DI=54272:POKE53281,15
120 GOTO1310
130 PRINT"■■"
140 PRINT"■┌──────────┐"
150 PRINT"|■0     10■|"
160 PRINT"|          |"
170 PRINT"└──────────┘                        ┌──
──┐"
180 PRINT"┌──────┐                          |
M |
190 PRINT"|■M/S ■|                            |
 120|
200 PRINT"|      |                            |
  |
210 PRINT"|■+4  ■|                            |
 100|
220 PRINT"|      |                            |
  |
```

```
230 PRINT"|■+2  ■|                                    |
  80|
240 PRINT"|    |                                      |
  |
250 PRINT"| ■0  ■|  ——  ——    ————  ————             |
  60|
260 PRINT"|    |                                      |
  |
270 PRINT"|■-2  ■|                                    |
  40|
280 PRINT"|    |                                      |
  |
290 PRINT"|■-4  ■|                                    |
  20|
300 PRINT"|    |                                      |
  |
310 PRINT"|■-6  ■|                                    |
   0|
320 PRINT"\————/                                     \—
—/
330 PRINT"/————————————————————————————————————————
——\
340 PRINT"|
  |
350 PRINT"|  ■60  70  80  90 100 110 120 K
M/H|
360 PRINT"\————————————————————————————————————————
—/"
370 RETURN
380 PRINT"■'RETURN<";
390 GETZ$:IFZ$<>CHR$(13)GOTO390
400 RETURN
410 DATA59,58,76,75,74,72,71,70,68,83,65
420 DATA119,69,68,67,64,70,82,111
430 DATA48,49,50,51,52,53,54,55,56,57
440 AZ=1056:BZ=AZ:DZ=AZ:EZ=AZ:FZ=AZ
450 GZ=AZ
460 FORI=0TO10:READY%(I):NEXTI
470 FORJ=0TO7:READZ%(J)       :NEXTJ
480 FORI=0TO9:READW%(I):NEXTI
490 X1=RND(2):X2=RND(3):X3=RND(4)
500 H=50+X1*60:E=800+X2*H*2:FL=0
510 V=80+X3*(120-H):K=0:F=0:O=TI:FC=0
```

```
520 GETC$:IFC$=""THENC$=" "
530 C%=ASC(C$)
540 FORI=0TO10:IFC%=Y%(I)THENFC=I-5
550 NEXT
560 FORJ=0TO9:IFC%=W%(J)THENK=J
570 NEXT
580 D=(TI-O)/(60*A%):O=TI
590 FL=FL/100+FC*4
600 V=V*(1-.01*FL-.04*K):IFV>80THENS=(V-80
)/80
610 IFV<=80THENS=(V-80)/15
620 S=-(S*S+.7)*(1-FL*.01+K*.25)
630 E=E-D*(V/3.6)
640 H=H+D*S
650 L=-(H*V)/(S*3.6)
660 A=(L-E)*SIN(ATN(H/L))
670 F=SIN(FL*π/180)
680 IFE<-150GOTO1120
690 POKEAZ,32:I=117:K1=INT(K/2)
700 K2=K/2:IFK2>K1THENI=118
710 J=1145+K1:AZ=J:POKEJ,I:POKEJ+DI,6
720 POKEBZ,32:I=120:K1=INT(ABS(S)/2)
730 K2=ABS(S/2):IFK2>K1+.5THENI=121
740 K1=-K1*SGN(S):IFK1<-3GOTO780
750 IFK1>4GOTO790
760 J=1547+K1*40:BZ=J
770 POKEJ,I:POKEJ+DI,6:GOTO800
780 POKESI+4,33:BZ=1228:POKEBZ,35:POKEBZ+D
I,2:POKESI+4,0:GOTO800
790 POKESI+4,33:BZ=1748:POKEBZ,35:POKEBZ+D
I,2:POKESI+4,0
800 POKEDZ,32:I=121:IFH<0GOTO1080
810 K1=INT(H/10)+.5:K2=H/10
820 IFK2>K1THENI=120
830 J=1734-INT(K1)*40:DZ=J
840 POKEJ,I:POKEJ+DI,6
850 POKEEZ,32:I=117:K1=INT(V/2.5)-22
860 K2=V/2.5-22:IFV<55GOTO900
870 IFV>130GOTO910
880 J=1866+K1:EZ=J:IFK2>K1THENI=118
890 POKEJ,I:POKEJ+DI,6:GOTO920
900 POKESI+4,33:EZ=1866:POKEEZ,35:POKEEZ+D
I,2:POKESI+4,0:GOTO920
```

```
910 POKESI+4,33:EZ=1897:POKEEZ,35:POKEEZ+D
I,2:POKESI+4,0
920 POKEFZ,32:I=43:IFF>1THENI=209
930 IFF<-.7THENI=209
940 IFF<-.7THENF=-.7
950 IFF>1THENF=0
960 GOTO990
970 J=1064+K1*40:FZ=J:POKEJ,H:POKEJ+DI,2
980 J1=-SGN(F*10-10)
990 K1=-INT(F*10-11)
1000 J=1075+K1*40:FZ=J:POKEJ,I:POKEJ+DI,2
1010 A=A+56:IFA>136THENA=136
1020 POKEGZ,32
1030 IFA<0THENA=0
1040 K2=INT(A):K3=INT(A/8):K2=K2-K3*8
1050 I=Z%(K2):J=1766-K3*40:GZ=J
1060 POKEJ,I:POKEJ+DI,2:EE=INT(E/25)+5:IFE
E<41ANDEE>=0THENFR(EE)=H
1070 GOTO520
1080 IFS<-1.5GOTO1120
1090 IFE>0GOTO1120
1100 IFV>90GOTO1120
1110 PRINT"□SMOOTH LANDING.":GOSUB2190:GOT
O1270
1120 REM PRINT"□"
1130 IFH<0GOTO1220
1140 PRINT"□SPEED          :"V;"KM/H"
1150 PRINT"HEIGHT          :"H;"M"
1160 PRINT"CLIMB           :"S;"M/S"
1170 PRINT"DISTANCE TO TOUCH"
1180 PRINT"DOWN POINT      :"E;"M"
1190 PRINT"PROSPECTIVE"
1200 PRINT"CONTACT WITH"
1210 PRINT"SURFACE         :"L;"M":GOSUB219
0:GOTO1260
1220 FORI=1TO4:POKE53281,0:POKESI+4,129
1221 FORK=1TO30:POKESI+1,K:NEXTK:POKESI+4,
0
1222 POKE53281,1:POKESI+4,129
1223 FORK=30TO1STEP-1:POKESI+1,K:NEXTK:POK
ESI+4,0:NEXTI
1225 POKE53281,15:POKESI+1,52
1228 PRINT"□SPEED                :";V;"KM
/H"
```

```
1230 PRINT"DISTANCE TO TOUCH"
1240 PRINT"DOWN POINT      :";INT(E);"M"
1250 PRINT"SINK BEFORE CRASH    :";-S;"M/S
":GOSUB2190
1260 PRINT"ANOTHER ";
1270 PRINT"TRY NEVERTHELESS";:INPUTA$
1280 RESTORE
1290 B$=LEFT$(A$,1):IFB$="Y"GOTO2160
1300 PRINT"":PRINT"GOOD LUCK !":END
1310 PRINT"LANDING SIMULATION"
1320 PRINT"==========================="

1330 PRINT"A PLANE IS APPROXEMATELY 100
0 M":PRINT" FROM THE RUNWAY
1340 PRINT"IN A HEIGHT OF 80M":PRINT"TRY
 TO LAND WITHIN 150M OF THE"
1350 PRINT"RUNWAY WITH LESS THAN 90 KM/H"

1360 PRINT"AND LESS THAN 1.5 M/S SINKING
SPEED"
1370 PRINT"IF 'RETURN' APPEARS ON THE
SCREEN"
1380 PRINT"PRESS THE 'RETURN'-KEY"
1390 PRINT"DO YOU KNOW THE INSTRUMENTS "
;
1400 INPUTA$:B$=LEFT$(A$,1):IFB$="Y"GOTO21
60
1410 GOSUB130
1420 PRINT"S"
1430 FORI=0TO3:PRINT"
                    ":NEXT
1440 FORI=0TO18:PRINT"
                      ":NEXT
1450 PRINT"S"
1460 PRINT"THIS INSTRUMENT SHOWS THE POSIT
ION OF"
1470 PRINT"THE LANDING FLAPS (0-9). THIS"
1480 PRINT"POSITION MAY BE CHANGED USING T
HE"
1490 PRINT"NUMBER KEYS"
1510 PRINT"RETRACTED LANDING FLAPS (0)"
1520 PRINT"DON'T INFLUENCE THE FLYING CHAR
ACTER-"
```

```
1530 PRINT"ISTICS. POSITIONS 1-9 OF THE LA
NDING"
1540 PRINT"FLAPS INCREASE THE SINK AND DEC
REASE"
1550 PRINT"THE SPEED."
1560 PRINT"THE 'RETURN'-KEY DOES N O T HAV
E"
1570 PRINT"TO BE PRESSED WHEN ENTERING THE
SE DATA"
1580 GOSUB380
1590 GOSUB130
1600 PRINT"■":FORI=0TO3:PRINT"
                              ":NEXT
1610 FORI=0TO14:PRINT"▶▶▶▶▶▶▶▶
                    ":NEXT
1620 FORI=0TO3:PRINT"
                    ":NEXT
1630 PRINT"■THE VARIOMETER INDICATES A RIS
E"
1640 PRINT"OR A DESCEND OF THE PLANE."
1650 GOSUB380
1660 GOSUB130:PRINT"■"
1670 FORI=0TO18:PRINT"
      ":NEXT
1680 FORI=0TO3:PRINT"
                    ":NEXT
1690 PRINT"■THE ALTIMETER SHOWS THE HEIGHT
 OVER"
1700 PRINT"THE RUNWAY IN METERS."
1710 GOSUB380
1720 GOSUB130:PRINT"■"
1730 FORI=0TO18:PRINT"
                    ":NEXT
1740 PRINT"■THE SPEEDOMETER TELLS THE"
1750 PRINT"SPEED OF THE PLANE IN KM/H."
1760 PRINT"THE LOWEST SINKING SPEED OF THE
 PLANE"
1770 PRINT"IS AT 80 KM/H."
1780 PRINT"DO NOT GO BELOW 60KM/H"
1800 GOSUB380
1810 GOSUB130:PRINT"■"
1820 FORI=0TO18:PRINT"          ▶▶▶▶▶▶▶▶
                    ":NEXT
```

```
1830 FORI=0TO3:PRINT"
                    ":NEXT
1840 PRINT"■THE ARTIFICIAL HORIZON"
1850 PRINT"A CROSS"
1860 PRINT"BETWEEN THE TWO LINES, INDICATE
S,"
1870 PRINT"WHETHER THE NOSE OF THE PLANE"
1880 PRINT"IS BELOW OR ABOVE THE LEVEL"
1900 PRINT"THIS POSITION MAY BE INFLUENCED
"
1910 PRINT"WITH THE UPPER ROW OF CHARACTER
"
1920 PRINT"KEYS."
1930 PRINT"■■■■■■IT MEANS :":PRINT
1940 PRINT"A  S  D  F  G     H     J  K  L
  :  ;"
1950 PRINT"NOSE UP                    NOSE DO
WN"
1960 PRINT"LESS SPEED                 MORE SP
EED"
1970 PRINT"LESS SINK                  MORE SI
NK"
1980 PRINT"THE 'RETURN'-KEY DOES  N O T  H
AVE"
1990 PRINT"TO BE PRESSED ."
2000 GOSUB380
2010 GOSUB130:PRINT"■"
2020 FORI=0TO18:PRINT"                    ■■■
                    ":NEXT
2030 FORI=0TO3:PRINT"
                    ":NEXT
2040 PRINT"■THE TWO LINES SHOW THE BEGINNI
NG"
2050 PRINT"OF THE RUNWAY."
2060 PRINT"THE LINE INBETWEEN THESE LINES"

2070 PRINT"SHOWS THE CALCULATED TOUCH DOWN
"
2080 PRINT"POINT."
2090 PRINT
2100 PRINT"THE LANDING IS O.K. IF THE PLAN
E"
```

```
2110 PRINT"TOUCHES THE RUNWAY WITHIN 150 M
ETERS"
2120 PRINT"OF SAME WITH A MAXIMUM OF 90 KM
/H"
2130 PRINT"AND A MAXIMUM OF 1.5 M/S"
2140 PRINT"SINKING SPEED."
2150 GOSUB380
2160 PRINT"[CLR]":INPUT"TIME FACTOR (1=REALTIM
E)";A%:A%=ABS(A%):IFA%=0GOTO2160
2170 GOSUB130
2180 GOTO410
2190 GOSUB380
2200 PRINT"[CLR][DOWN][DOWN][DOWN][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT]←FLIGHT RECORD"
2210 PRINT"[HOME][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][RVS]────┬────┐
───┬────┬────┬────┬────┬────┬────"
2220 FORM=1TO40
2230 IFFR(M)<=0THEN2300
2240 K2=INT(FR(M))
2250 K3=INT(FR(M)/8)
2260 K2=K2-K3*8
2270 N=Z%(7-K2)
2280 J=1864-M-K3*40
2290 POKEJ,N:POKEJ+DI,2
2300 NEXTM
2310 FL=0:K=0:F=0
2320 FORI=0TO41:FR(I)=0:NEXTI
2330 RETURN
```

7 Butterfly

This little program draws symmetrical figures on the screen when you enter two numbers. The first number should be smaller than the second one. After the drawing is finished, press the space bar for the next figure.

```
2 REM DRAW SYMMETRICAL FIGURE
4 PRINT"□ ENTER TWO NUMBERS, FOR EXAMPLE"
6 PRINT" 10,15 AND PRESS RETURN"
8 PRINT"■ WATCH THE DRAWING ON THE SCREEN"

10 POKE53280,8:POKE53281,1:REM BORDER AND
BACKGROUND COLORS
20 Z=12 : Q=81 :REM CHARACTER
30 K=1.25
40 S=1024 : C=55296 :REM SCREEN & COLOR
50 T=3
60 INPUT"■ ENTER 2 NUMBERS ";A,B : PRINT "
"
70 REM DRAW IT
100 FOR TH=0 TO 2*π STEP 2*π/180
107 R=Z*SIN(TH*T)
110 X% =K*R*COS(A*TH)
115 Y% =R*SIN(B*TH)
120 P=(12+Y%)*40+X%+20
130 POKE S+P,Q:POKEC+P,2
140 NEXT TH
150 GETA$:IFA$=""THEN150
160 PRINT"□":GOTO60
```

NOTES

Eternal Calendar

This program calculates a calendar for any month in any year past the year 0. For months of years before 1900 it takes a while to calculate the calendar. The calendar as well as the time it took the computer to calculate will be displayed on the screen.

```
10 POKE53281,7:POKE53280,3
20 PRINTCHR$(144)
50 PRINT"■■■■■■■■■■PROGRAM CALCULATES A CAL
ENDAR"
52 PRINT:PRINT"           FOR ANY MONTH"
54 PRINT:PRINT "         SINCE THE YEAR 0"
60 CLR:DIM M$(24):T0=TI
80 PRINT:PRINT"ENTER 4 DIGITS FOR THE YEAR
":PRINT:INPUT"           ";G
82 INPUT"MONTH(1-12)";M
84 IF G<1900 THEN 105
90 D=(G-1900)*365
92 FOR Q=1901 TO G-1
94 IF Q/4=INT(Q/4) THEN D=D+1
96 NEXT
98 D=D+2
100 GOTO 270
105 PRINT "■■■■■■■■■■■■THIS YEAR TAKES A WHI
LE !"
110 D=G*365
120 FOR Q=1 TO G-1
126 IF Q/400=INT(Q/400) THEN 130
128 IF Q/100=INT(Q/100)THEN 140
```

```
130 IF Q/4=INT(Q/4) THEN D=D+1
140 NEXT
150 D=D+1
270 PRINT"♥QQQQQQ]]]]]]]]]]]]]]]]     CALENDAR"

280 FOR J=1 TO 24:READ M$(J):NEXT
290 FOR J=1TO7:READ D$(J):NEXT
300 PRINT M$(2*M-1)TAB(35)G
310 PRINT:PRINT:FOR J=1 TO 7:PRINT TAB(6*(
J)-6)D$(J);" ";:NEXT
316 IF G/400=INT(G/400)THEN 320
318 IF G/100=INT(G/100) THEN 330
320 IF G/4=INT(G/4) THEN M$(4)="29"
330 FOR J=2 TO 2*M-2 STEP 2:S1=S1+VAL(M$(J
)):NEXT
332 IF M=1 THEN S1=0
340 S=S1+D-7*INT((S1+D)/7)
350 V=VAL(M$(2*M))
360 S=S+7:IF S>7 THEN S=S-7
370 T=1+6*(S-1):U=5
380 PRINT:PRINTTAB(T-1);
382 IF T=37 THEN 391
390 FORD=1TOV:GOTO392
391 PRINT 1:FOR D=2TOV
392 PRINT D;SPC(U-LEN(STR$(D)));
400 IF POS(0)>34 THEN U=3
410 IF POS(0)<34 THEN U=5
420 NEXT
422 PRINT:PRINT:PRINT:PRINT TAB(10)"TIME =
"INT((TI-T0)/36)/100 "MINUTES"
430 PRINT:INPUT "ANOTHER YEAR (Y/N) ";K$
440 IF LEFT$(K$,1)="Y" THEN 60
450 IF LEFT$(K$,1)="N" THEN END
460 GOTO 430
710 DATA JANUARY,31,FEBRUARY,28,MARCH,31,A
PRIL,30,MAY,31,JUNE,30,JULY,31
720 DATA AUGUST,31,SEPTEMBER,30,OCTOBER,31
,NOVEMBER,30,DECEMBER,31
730 DATA SUN,MON,TUE,WED,THU,FRI,SAT,SUN
```

Bomber

9

In this game you fly a fighter plane. Your mission is to fire missiles at hostile submarines. Use key 'F' to fire one or several shots at the submarine. The number of rounds, the number of hits, and the percentage of hits to shots will be displayed.

```
4 PRINT"■"
5 PRINT"  ■                    *BOMBER*
    "
6 POKE53281,7:POKE53280,3
7 B$="■■■■■■■■■■■■■■■■■■■■■■■■■"
10 FORG=1TO1000:NEXTG
15 PRINT"■"
20 PRINT"YOU ARE FLYING A STARFIGHTER"
25 PRINT"AND YOU ARE PATROLLING THE AIR-"
30 PRINT"SPACE OFF THE EAST COAST."
35 PRINT"HOSTILE SUBMARINES ARE APP-"
40 PRINT"ROACHING THE COAST. YOUR MISSION"

45 PRINT"IS TO HINDER THEM FROM PENE-"
47 PRINT"TRATING HOME WATERS"
48 PRINT
50 PRINT"THE PATH OF THE MISSILE IS INFLUE
NCED"
55 PRINT"BY YOUR SPEED AND THE SPEED OF TH
E WATER"
65 PRINT"PRESS 'F' TO FIRE"
70 PRINT
75 PRINT"READY (Y-N)?"
80 GETH$:IFH$=""THEN 80
85 IFH$="Y"THEN PRINT"■";:GOTO110
90 IFH$="N"THEN 95
95 PRINT
```

```
96 PRINT"YOU WANTED TO PLAY ANYWAY"
100 PRINT"LET'S GO"
105 FORI=1TO3000:NEXTI:PRINT"▯";
110 PRINT"▩"
115 PRINT"▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
▬▬▬▬▬▬▬▬▬▬▬▬▬"
120 PRINT"▩▩▩▩▩▩▩▩▩▩▩▩▩▩▩"
125 PRINT"▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬
▬▬▬▬▬▬▬▬▬▬▬▬▬"
130 PRINT"▩"
135 PRINT"▩▩▩▩▩▩▩▩▩▩▩▩▩▩"
140 PRINT"______________________________________________
_____________"
145 GOSUB244:PRINT"▩"
155 FORA=1TO32
165 PRINTTAB(A):PRINT"▩▩▩▩ +▬▬▬▬O "
170 GETC$:IFC$=""THEN200
175 IFC$="F"THEN180
176 GOTO200
180 GOSUB 2000: FORD=1TO10
185 PRINTTAB(D+A):PRINT".":NEXTD
190 PRINTTAB((D+A)-3):PRINT"*****"
195 GOTO220
200 PRINT"▩▩▩▩▩▩▩▩▩"
205 B=(A-32)*-1
210 PRINTTAB(B+1):PRINT" ▬ "
215 GOTO225
220 M=M+1
221 IF(D+A)=24THEN240
224 IFM=50THEN280
225 PRINT"▩"
230 NEXTA
235 PRINT"▯":GOTO110
240 J=J+1
241 GOSUB2100
242 IFJ=11THEN270
243 PRINT"▯":GOTO110
244 PRINTB$;"▩SCORE ";J:PRINT"▩▩ROUNDS ";M
:IFM=0THEN250
247 PRINT"▩▩AVERAGE =";INT(100*(J/M));"▮▩"
250 RETURN
260 GOTO110
270 RESTORE
```

```
275 GOTO110
280 RESTORE
285 GOTO110
2000 V=54296:W=54276:R=54277:H=54273:L=542
72
2010 POKEV,15:POKEW,65:POKER,15
2020 FOR X=20TO5STEP-2:POKEH,40:POKEL,X:NE
XT
2030 FORX=15 TO5STEP-2:POKEH,40:POKEL,X:NE
XT
2035 POKE W,0:POKER,0: RETURN
2100 FOR X=15TO0STEP-1:POKEV,X:POKEW,129:P
OKER,15:POKEH,40:POKEL,200:NEXT
2110 POKE W,0:POKER,0:RETURN
2120 REM
```

NOTES

10

Bouncing Ball

This game is similar to the game wallbreaker which is also in this book. You have to destroy a wall with a bouncing ball. You move a paddle at the bottom of the playfield to keep the ball from leaving the playfield. There is a total of nine balls. The paddle can be moved to the left with key '1' and to the right with key '3'. The difference between this game and the game wallbreaker is, that the paddle keeps moving in the defined direction unless it is stopped with key '2'.

```
1 POKE53281,7:POKE53280,3:PRINTCHR$(144)
5 SC=0:BL=9:PP=17:S=1024:PM=0
6 A$=" ▌":B$="▌"
10 PRINT"▚▚▚▚"
11 FOR I=1 TO 6:C$=MID$("  ▒▒  ",I,1)
12 PRINT"   ";:IF I<3 OR I>4 THEN PRINT"▚";

15 FOR N=1 TO 32:PRINTC$;:NEXT N
17 PRINT"■ ":NEXT I
45 PRINT"▚";
46 PRINT" ▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀▀
▀▀"
48 FOR N=1TO 23
49 PRINT A$;:PRINT TAB(34);B$
50 NEXT N
70 GOSUB 451:GOSUB 236:GOTO 145
100 REM MAIN PROGRAM
```

```
101 GOSUB 200 : REM PADDLE MOVEMENT
103 BP=BP+BD
104 IF BP>2023 GOTO 135
107 PK=PEEK(BP)
109 IF PK=32 OR PK=96 THEN 115
112 GOSUB 300:REM BALL REBOUND
113 IF PEEK(BP)<>32 GOTO 103
115 POKE BO,32
121 POKE BP,81:POKE(BP-1024)+55296,2
122 BO=BP
125 GOSUB 200 : REM MOVEMENT PADDLE
130 GOTO 100
135 BL=BL-1
137 GOSUB 451
138 POKE BO,32
140 IF BL<=0 GOTO 800
141 TIM$="000000"
142 GOSUB200
143 IF TI<100 GOTO 142
145 BP=1426+2*INT(10*RND(1)+1)+BL-2*INT(BL
/2):BO=BP
150 BD=39+2*INT(RND(1)+.5)
155 GOTO 100
200 GET D:IF D=0 THEN 210
205 PM=D-2: IF ABS(PM)>1 THEN PM=0:RETURN
210 IF PEEK(515)=255 THEN PM=0:RETURN
220 PP=PP+PM
225 IF PP<=0 THEN PP=0
230 IF PP>=30 THEN PP=30
236 PRINTTAB(PP);" ┌──┐ ";"┐"
240 RETURN
300 SC=SC+1
320 IF PK=118 OR PK=117 THEN GOSUB 500:BD=
-BD:GOTO 450
334 IF PK=79 THEN BD=-41:GOTO 450
335 IF PK=99 THEN BD=BD-80:GOTO 450
336 IF PK=80 THEN BD=-39:GOTO 450
339 REM TOP OR SCORE
376 IF PK=160 GOTO405
377 SC=SC+10
378 IF PK=102 GOTO 405
380 GOSUB 500:GOTO 450
405 SC=SC+10
```

```
410 GOSUB 500
430 POKE BP,32
450 BP=BO
451 PRINT"■■■■■■SCORE =";SC;TAB(20);"BALLS
 =";BL
452 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■■■■■"
455 RETURN
500 BD=SGN(BD)*(ABS(BD)-80):RETURN
800 FOR I=1 TO 15:GET A$:NEXT
802 PRINT"■■■■■■■■■■■■■■■■■■";TAB(15);"AGAIN
?";
803 GET Y$: IF Y$="" THEN 803
805 IF LEFT$(Y$,1)="Y" GOTO 5
806 PRINT
808 PRINT:PRINTTAB(10);"THANKS FOR PLAYING
"
810 END
```

NOTES

Take a Match

11

In this game there are three piles of matches. In the beginning you define how many matches there are on each pile. At each turn the computer or you have to take away at least one match from one of the piles. You only can take a match or matches from one of the stacks at a time. The winner is the one who takes the last match or matches.

```
5 REM (C) ELCOMP PUBLISHING INC.
10 GOSUB600
15 PRINT"HOW MANY MATCHES ON EACH PILE"
20 INPUT"ENTER 3 NUMBERS ";A%,B%,C%
25 PRINT
30 PRINT"ENTER '1' IF YOU WANT TO START"
40 PRINT"ENTER '2' IF I SHOULD START"
50 GETR%:IFR%<>1ANDR%<>2THEN50
60 ONR%GOTO70,330
70 GOSUB600
80 GOSUB620
90 PRINT:PRINT"IT'S YOUR TURN"
100 PRINT:INPUT"ENTER PILE AND NUMBER ";I%
,J%
110 PRINT:IFJ%<1THENPRINT"YOU HAVE TO TAKE
 AT LEAST ONE !":GOTO100
120 ONI%GOTO150,180,210
130 PRINT"PILE NUMBER NOT EXISTING !"
140 GOTO80
150 A%=A%-J%
160 IFA%<0THEN280
170 GOTO230
180 B%=B%-J%
```

```
190 IFB%<0THEN280
200 GOTO230
210 C%=C%-J%
220 IFC%<0THEN280
230 GOSUB620
240 PRINT:IFA%=0ANDB%=0ANDC%=0THENPRINT"
                [illegible]":END
250 PRINT:PRINT"PRESS 'X' FOR COMPUTERS DR
AW"
260 GETR$:IFR$<>"X"THEN260
270 R$=" ":GOTO330
280 PRINT"DON'T TAKE MORE THAN THERE ARE !
"
290 IFA%<0THENA%=A%+J%
300 IFB%<0THENB%=B%+J%
310 IFC%<0THENC%=C%+J%
320 GOTO90
330 B=B%:C=C%
340 FORA=A%-1TO0STEP-1
350 GOSUB530
360 IFI1%=0THENA%=A:GOTO510
370 NEXT
380 A=A%
390 FORB=B%-1TO0STEP-1
400 GOSUB530
410 IFI1%=0THENB%=B:GOTO510
420 NEXT
430 B=B%
440 FORC=C%-1TO0STEP-1
450 GOSUB530
460 IFI1%=0THENC%=C:GOTO510
470 NEXT
480 IFC%<>0THENC%=C%-1:GOTO510
490 IFB%<>0THENB%=B%-1:GOTO510
500 A%=A%-1
510 PRINT:IFA%=0ANDB%=0ANDC%=0THENPRINT"
                [illegible]":GOSUB620:END
520 GOTO70
530 N%=A:M%=B
540 GOSUB580
550 N%=I1%:M%=C
560 GOSUB580
570 RETURN
```

```
580 I1%=(N%ORM%)ANDNOT(N%ANDM%)
590 RETURN
600 PRINT"□▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒TAKE A MATCH▒▒▒▒▒▒
▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
610 RETURN
620 PRINT
625 PRINTTAB(5)"1ST PILE"SPC(3)"2ND PILE"S
PC(3)"3RD PILE"
630 PRINT
635 PRINTTAB(7)A%SPC(7)B%SPC(7)C%
640 PRINT
645 RETURN
```

NOTES

Bring Over 12

In this little game, you have to solve the following problem. A farmer with a wolf, a goat, and a head of lettuce has to cross a river. The boat can only carry him plus one of his three companions. What does he have to do so that the wolf doesn't eat the goat or the goat doesn't eat the lettuce while he is gone ? Enter the direction (R or L) and the number (1-4).

```
5 REM (C) ELCOMP PUBLISHING INC.
10 DIMA$(4):DIMB$(4):DIMA(4):DIMB(4)
20 A$(1)="1 WOLF":A$(2)="2 LETTUCE":A$(3)=
"3 GOAT":A$(4)="4 FARMER"
30 B$(1)="":B$(2)="":B$(3)="":B$(4)=""
40 B(1)=0:B(2)=0:B(3)=0:B(4)=0:SR=0
50 A(1)=2:A(2)=3:A(3)=4:A(4)=10:SL=19
60 GOSUB480
70 FORI=1TO4:PRINTA$(I);TAB(15);"
":NEXT
80 PRINT"
"
90 FORI=1TO4:PRINTTAB(30)B$(I):NEXT
100 GOSUB500:IFR1=1THENR1=0:GOTO20
110 IFSR=19THENPRINT:PRINT"CONGRATULATIONS
, PROBLEM SOLVED !":END
120 PRINT"
MOVE RIGHT -
 R"
130 PRINT"MOVE LEFT  - L"
140 PRINT"ENTER L OR R PLUS NUMBER"
150 PRINT"FARMER ALWAYS RIDES"
170 GETR$:IFR$<>"R"ANDR$<>"L"THEN170
180 GETR:IFR<>1ANDR<>2ANDR<>3ANDR<>4THEN180
190 IFR$="R"ANDR=1THEN270
200 IFR$="R"ANDR=2THEN280
210 IFR$="R"ANDR=3THEN290
220 IFR$="R"ANDR=4THEN300
```

```
230 IFR=1THEN310
240 IFR=2THEN320
250 IFR=3THEN330
260 IFR=4THEN340
270 B$(1)=A$(1):A$(1)="":B(1)=A(1):SL=SL-A
(1):SR=SR+A(1):A(1)=0:GOTO300
280 B$(2)=A$(2):A$(2)="":B(2)=A(2):SL=SL-A
(2):SR=SR+A(2):A(2)=0:GOTO300
290 B$(3)=A$(3):A$(3)="":B(3)=A(3):SL=SL-A
(3):SR=SR+A(3):A(3)=0:GOTO300
300 B$(4)=A$(4):A$(4)="":B(4)=A(4):SL=SL-A
(4):SR=SR+A(4):A(4)=0:GOTO360
310 A$(1)=B$(1):B$(1)="":A(1)=B(1):SR=SR-B
(1):SL=SL+B(1):B(1)=0:GOTO340
320 A$(2)=B$(2):B$(2)="":A(2)=B(2):SR=SR-B
(2):SL=SL+B(2):B(2)=0:GOTO340
330 A$(3)=B$(3):B$(3)="":A(3)=B(3):SR=SR-B
(3):SL=SL+B(3):B(3)=0
340 A$(4)=B$(4):B$(4)="":A(4)=B(4):SR=SR-B
(4):SL=SL+B(4):B(4)=0
350 GOSUB500:IFR1=1THENR1=0:GOTO20
360 IFSL<6ORSL>10THENIFSR<6ORSR>10THEN60
370 GOSUB480
380 FORI=1TO4:PRINTA$(I):NEXT
390 PRINT"TTTTT"
400 FORI=1TO4:PRINTTAB(30)B$(I):NEXT
410 PRINT"QQQQQQQQQQQQQ"
420 IFSL=6ORSR=6THENPRINT"WOLF EATS GOAT !
":GOTO450
430 IFSL=7ORSR=7THENPRINT"GOAT EATS LETTUC
E":GOTO450
440 PRINT"GOAT EATS LETTUCE,WOLF EATS GOAT"
450 PRINT:PRINT"PRESS 'X' FOR NEW GAME"
460 GETR$:IFR$<>"X"THEN460
470 GOTO20
480 PRINT"♥▬▬▬▬▬▬▬▬▬▬▬▬▬▬▬ BRING OVER ▬▬▬▬
▬▬▬▬▬▬▬▬▬▬"
490 RETURN
500 IFA(1)=B(1)ORA(2)=B(2)ORA(3)=B(3)ORA(4
)=B(4)THEN520
510 RETURN
520 PRINT"QQQQQWRONG INPUT - TRY AGAIN"
530 FORI=1TO2000:NEXT:R1=1:RETURN
```

Tic-Tac-Vic

13

TIC-TAC-VIC is a C64 version of TIC-TAC-TOE. When you type in the program be careful to enter all the blanks and the cursor control commands.
After typing it in, start the program with RUN. The computer will ask you whether you want 'X' or 'O'. The player with 'X' starts.
Try to get three of your characters in one line (vertical, horizontal, or diagonal).

```
1 REM ELCOMP HOFACKER
2 PRINT"■":POKE53280,4:POKE53281,1
3 PRINT"■":PRINT:PRINT
4 FORX=1TO6:PRINT"                  ■ ■
 ■":NEXTX
5 PRINT"■              1■ ■              2■ ■
   3"
6 PRINT"■
   "
7 FORX=1TO6:PRINT"                  ■ ■
 ■":NEXTX
8 PRINT"■              4■ ■              5■ ■
   6"
9 PRINT"■
   "
10 FORX=1TO6:PRINT"                  ■ ■
  ■":NEXTX
11 PRINT"■              7■ ■              8■ ■
   9"
50 PRINT"■DO YOU WANT 'X' OR 'O'"
52 GETC$:IFC$=""THEN52
55 IFC$="X"THEN475
```

```
60 P$="O":Q$="X"
100 G=-1:H=1:IFS(5)<>0THEN103
102 S(5)=-1:GOTO195
103 IFS(5)<>1THEN106
104 IFS(1)<>0THEN110
105 S(1)=-1:GOTO195
106 IFS(2)=1ANDS(1)=0THEN181
107 IFS(4)=1ANDS(1)=0THEN181
108 IFS(6)=1ANDS(9)=0THEN189
109 IFS(8)=1ANDS(9)=0THEN189
110 IFG=1THEN112
111 GOTO118
112 J=3*INT((M-1)/3)+1
113 IF3*INT((M-1)/3)+1=MTHENK=1
114 IF3*INT((M-1)/3)+2=MTHENK=2
115 IF3*INT((M-1)/3)+3=MTHENK=3
116 GOTO120
118 FORJ=1TO7STEP3:FORK=1TO3
120 IFS(J)<>GTHEN130
122 IFS(J+2)<>GTHEN135
126 IFS(J+1)<>0THEN150
128 S(J+1)=-1:GOTO195
130 IFS(J)=HTHEN150
131 IFS(J+2)<>GTHEN150
132 IFS(J+1)<>GTHEN150
133 S(J)=-1:GOTO195
135 IFS(J+2)<>0THEN150
136 IFS(J+1)<>GTHEN150
138 S(J+2)=-1:GOTO195
150 IFS(K)<>GTHEN160
152 IFS(K+6)<>GTHEN165
156 IFS(K+3)<>0THEN170
158 S(K+3)=-1:GOTO195
160 IFS(K)=HTHEN170
161 IFS(K+6)<>GTHEN170
162 IFS(K+3)<>GTHEN170
163 S(K)=-1:GOTO195
165 IFS(K+6)<>0THEN170
166 IFS(K+3)<>GTHEN170
168 S(K+6)=-1:GOTO195
170 GOTO450
171 IFS(3)=GANDS(7)=0THEN187
172 IFS(9)=GANDS(1)=0THEN181
```

```
173 IFS(7)=GANDS(3)=0THEN183
174 IFS(9)=0ANDS(1)=GTHEN189
175 IFG=-1THENG=1:H=-1:GOTO110
176 IFS(9)=1ANDS(3)=0THEN182
177 FORI=2TO9:IFS(I)<>0THEN179
178 S(I)=-1:GOTO195
179 NEXTI
181 S(1)=-1:GOTO195
182 IFS(1)=1THEN177
183 S(3)=-1:GOTO195
187 S(7)=-1:GOTO195
189 S(9)=-1
190 REM
195 PRINTCHR$(144);:PRINT"■THE COMPUTER GO
ES TO..."
196 PRINT"
    "
197 PRINT"
    ":PRINT""
202 GOSUB1000
205 GOTO500
450 IFG=1THEN465
455 IFJ=7ANDK=3THEN465
460 NEXTK,J
465 IFS(5)=GTHEN171
467 GOTO175
475 P$="X":Q$="O"
500 PRINT:PRINT"■ENTER YOUR TRY
"
501 GETC$:IFC$=""THEN501
502 M=VAL(C$)
505 FORX=1TO2:PRINT"
              ":NEXTX:PRINT""
506 IFM=0THENPRINT"THAT WAS GOOD !":GOTO20
01
507 IFM>9THEN509
508 IFS(M)=0THEN510
509 PRINT"FIELD IS OCCUPIED !":PRINT:PRINT
:GOTO500
510 G=1:S(M)=1
520 GOSUB1000
530 GOTO100
1000 GOSUB3000
```

```
1095 FORI=1TO7STEP3
1100 IFS(I)<>S(I+1)THEN1115
1105 IFS(I)<>S(I+2)THEN1115
1110 IFS(I)=-1THEN1350
1112 IFS(I)=1THEN1200
1115 NEXTI:FORI=1TO3:IFS(I)<>S(I+3)THEN115
0
1130 IFS(I)<>S(I+6)THEN1150
1135 IFS(I)=-1THEN1350
1137 IFS(I)=1THEN1200
1150 NEXTI:FORI=1TO9:IFS(I)=0THEN1155
1152 NEXTI:GOTO1400
1155 IFS(5)<>GTHEN1170
1160 IFS(1)=GANDS(9)=GTHEN1180
1165 IFS(3)=GANDS(7)=GTHEN1180
1170 RETURN
1180 IFG=-1THEN1350
1350 PRINT"I WIN !":GOTO2001
1400 PRINT"THAT WAS GOOD !"
2001 PRINT:PRINT"ANOTHER GAME (Y/N) ?"
2002 GETC$:IFC$=""THEN2002
2003 IFMID$(C$,1,1)="Y"THENCLR:GOTO2
2004 END
3000 FORI=1TO9
3005 PRINT"":IFI<4THENAB=2:GOTO3040
3010 IFI>6THENAB=16:GOTO3040
3020 AB=9
3040 FORX=1TOAB+1:PRINT:NEXTX
3050 IFI=1ORI=4ORI=7THENBA=4:GOTO3071
3060 IFI=2ORI=5ORI=8THENBA=15:GOTO3071
3070 BA=26
3071 IFP$="X"THEN3080
3072 IFS(I)=-1THENGOSUB4020
3073 IFS(I)=1THENGOSUB5020
3074 NEXTI:RETURN
3080 IFS(I)=-1THENGOSUB5020
3090 IFS(I)=1THENGOSUB4020
3095 NEXTI:RETURN
4020 PRINTTAB(BA)"
4050 PRINTTAB(BA)"
4060 PRINTTAB(BA)"
4070 PRINTTAB(BA)"
4080 PRINTTAB(BA)"
```

```
4090 RETURN
5020 PRINTTAB(BA)"  "
5050 PRINTTAB(BA)"  "
5060 PRINTTAB(BA)"  "
5070 PRINTTAB(BA)"  "
5090 RETURN
```

NOTES

Airbattle 14

This game is played by two players. The left player shoots with 'A', the right player shoots with '0'.
Different planes flying at different heights are flying over the playfield. Try to shot them down.

```
8 PRINT"□";
9 FORI=1TO39:PRINT"*";:NEXTI:PRINT
10 PRINT"*          SHOOT OFF PLANES
     *"
11 FORI=1TO39:PRINT"*";:NEXTI:PRINT
12 PRINT:PRINT:PRINT
13 POKE 53281,1:POKE53280,2
14 PRINTCHR$(144)
15 PRINT"YOU CAN SHOOT AT 4 DIFFERENT AIMS
"
16 PRINT"AT DIFFERENT TIMES.":PRINT
17 PRINT"THE AIMS ARE AT DIFFERENT ALTITUD
ES"
18 PRINT:PRINT"THE 1ST PLAYER USES 'A' TO
SHOOT"
20 PRINT:PRINT"THE 2ND PLAYER USES '0' TO
SHOOT"
26 PRINT:PRINT"SCORE 21 WINS THE GAME !":P
RINT
30 PRINT:PRINT"HIT ANY KEY TO START"
35 GETZ$:IFZ$=""GOTO35
90 PRINT"□":CLR
91 FORI=1TO20:PRINT:NEXTI
92 PRINT"      A=FIRE   |";TAB(25);"|    0
=FIRE"
93 PRINTTAB(14);"━━━";TAB(24);"━━━"
95 PRINT"■"
```

```
100 X=INT(RND(1)*10)+3:S=0
105 X3=1064+X*40
110 FORI=1TOX:PRINT"■";:NEXTI
115 X1=INT(RND(1)*4)+1
120 ON X1 GOSUB 200,300,400,460,460
125 PRINT"■"
130 GOTO100
200 FORI=1TO35
201 : IFS=1GOTO230
205 : PRINT"■▀▀ ▀▄▀▄▄▄▄▄■";
210 : PRINT"▀▀▀■ ▀▀▄▄▄▄▄▀";:E=4
211 : IFA$="A"GOTO220
212 : IFB$="0"GOTO220
213 : T=TI
215 : IFTI-T<16-XGOTO215
220 : PRINT" ■▄▌ ▀";:X3=X3+1
225 : GOSUB800
230 NEXTI
240 PRINT"     ▄▄▄▄▄■     "
250 RETURN
300 FORI=1TO35
301 : IFS=1GOTO330
305 : PRINT"■▀▀▄▄▄▄▄▄▄■";
310 : PRINT"▀▀▀▀▀▄▄▄▄▄▀";:E=4
311 : IFA$="A"GOTO320
312 : IFB$="0"GOTO320
313 : T=TI
315 : IFTI-T<15-XGOTO315
320 : PRINT" ■▄▌ ▀";:X3=X3+1
325 : GOSUB800
330 NEXTI
340 PRINT"     ▄▄▄▄▄■     "
350 RETURN
400 FORI=1TO35
401 : IFS=1GOTO430
405 : PRINT"■▀▀▄▄▄▄▄▄▄■";
410 : PRINT"▀▀▀▀▀▄▄▄▄▄▀";:E=4
411 : IFA$="A"GOTO420
412 : IFB$="0"GOTO420
413 : T=TI
415 : IFTI-T<15-XGOTO415
420 : PRINT" ■▄▌ ▀";:X3=X3+1
425 : GOSUB800
```

```
430 NEXTI
440 PRINT"      ■■■■■■■■      "
450 RETURN
460 FORI=1TO35
461 : IFS=1GOTO490
465 : PRINT"■";
470 : PRINT"->■■■";:E=2
471 : IFA$="A"GOTO480
472 : IFB$="0"GOTO480
473 : T=TI
475 : IFTI-T<5-XGOTO475
480 : PRINT" ■■■ ";:X3=X3+1
485 : GOSUB800
490 NEXTI
495 PRINT"      ■■■■■■■■      "
496 RETURN
600 IFZ$="A"THENA$="A"
610 IFZ$="0"THENB$="0"
620 RETURN
700 REM FIRING ROUTINE
701 P=INT(RND(1)*3)+1
702 FORD=1TOP
705 : IFA$<>"A"GOTO720
706 : IFY=0GOTO708
707 : POKE1919-Y,32
708 : POKE1879-Y,43:Y=Y+40
709 : IF1919-Y-X3>EGOTO715
710 : IF1919-Y-X3>=0 GOTO900
715 IFY>760 THEN A$="":POKE1919-Y,32:Y=0
718 NEXTD
720 P=INT(RND(1)*3)+1
722 FORD=1TOP
723 : IFB$<>"0"GOTO760
735 : IFZ=0GOTO750
740 : POKE1929-Z,32
750 : POKE1889-Z,43:Z=Z+40
752 : IF1929-Z-X3>EGOTO755
753 : IF1929-Z-X3>=0 GOTO950
755 : IFZ>760 THEN B$="":POKE1929-Z,32:Z=0

759 NEXTD
760 RETURN
800 IFA$="A"THEN GOSUB700
```

```
805 IFB$="0"THEN GOSUB700
810 GETZ$:IFZ$=""THENRETURN
820 IFZ$="A"THENA$="A":GOSUB7000:RETURN
830 IFZ$="0"THENB$="0":GOSUB7000:RETURN
840 RETURN
900 REM TARGET HIT
910 PRINT"*****▒▒▒▒▒▒▒*****▒▒▒▒▒▒";:GOSUB70
05
920 A$="1":AS=AS+1:Y=0:S=1:GOSUB 7000
921 PRINT"     ▒▒▒▒▒▒▒     ";
925 PRINT"▒":PRINTTAB(9);"SCORE =";AS
930 IFAS=21THEN N=9:GOTO1000
940 RETURN
950 PRINT"*****▒▒▒▒▒▒▒*****▒▒▒▒▒▒";:GOSUB70
05
960 B$="1":BS=BS+1:Z=0:S=1:GOSUB7000
961 PRINT"     ▒▒▒▒▒▒▒     ";
965 PRINT"▒":PRINTTAB(24);"SCORE =";BS
970 IFBS=21THEN N=24:GOTO1000
975 RETURN
1000 PRINT"▒▒";
1005 FORI=1TO10
1010 : PRINTTAB(N);"WINNER";:T9=TI
1015 : IFTI-T9<50GOTO1015
1016 : PRINTTAB(N);"▒▒▒▒▒▒▒WINNER▒▒▒▒▒▒▒";

1020 NEXTI
1025 PRINT
1030 GOTO90
7000 V=54296:Q=54276:A=54277:H=54273:L=542
72
7001 FOR M=15 TO 0 STEP-1:POKEV,M:POKEQ,12
9:POKEA,15:POKEH,40:POKEL,200:NEXT
7002 POKEQ,0:POKE A,0
7003 RETURN
7005 POKE59467,16:POKE59466,15:POKE59464,2
00:T9=TI
7010 IFTI-T9<30GOTO7010
7015 RETURN
```

Wordgame 15

This program is another version of the popular Hangman game, in which you have to guess the word the computer has chosen.

Everytime you guess a wrong letter, you get a step closer to the gallows.

You can select the subject of which you wish to guess a word. The subjects are :

Computer
Sport
Car
Countries
Miscellaneous

```
100 REM  *****  HANGMAN  *****
110 REM  BY   **** ELCOMP ****
115 POKE53281,1:POKE53280,2
130 PRINT"■■■■■■■■■"
140 PRINT"                  ┌──────────┐"
150 PRINT"                  │ HANGMAN! │"
160 PRINT"                  └──────────┘"
170 FORX=1TO2000:NEXTX
390 INPUT"■■■■■■■ ENTER YOUR NAME ";NM$:NM$
=LEFT$(NM$,9)
400 DIM HM$(8),TD$(6,4),PR$(17)
410 FOR I=1 TO 8:READ HM$(I):NEXT
420 FOR I=1 TO 6: FOR J=1 TO 4
430 READ TD$(I,J):NEXT:NEXT
440 A$="■■■■■":B$="■■■■■■■■■■■■■■"
450 PRINT"■■SELECT ONE OF THESE SUBJECTS : "
```

```
460 CT$(1)="COMPUTER":CT$(2)="SPORT"
470 CT$(3)="CAR":CT$(4)="COUNTRIES"
480 CT$(5)="MISCELLANEOUS"
490 FOR A=1 TO 5:PRINTA;"▌. ";CT$(A):NEXT
500 PRINT"▓▓ YOUR CHOICE "+NM$;
510 INPUT C
520 IF C<1 OR C>5 OR C<>INT(ABS(C)) GOTO 4
50
530 PRINT"▓I THINK OF A WORD..."
540 TT=TI
550 FOR I=0 TO (C-1)*20+INT(RND(1)*20)
560 READ WD$:NEXT
570 IF TI-TT<120 GOTO 570
580 LM$="":PR$="":LG$=""
590 FORI=1 TO LEN(WD$)
600 IF MID$(WD$,I,1)=" " THEN PR$(I)=" ":P
R$=PR$+" ":GOTO 620
610 PR$(I)="-":PR$=PR$+"-"
620 NEXT I
630 VP=17:HP=0:M=0
640 PRINT"▓";
650 FOR I=1 TO 16:PRINT"▓";:NEXT
660 FOR I=1 TO 8:PRINT:PRINTHM$(I);:NEXT
670 FOR I=1 TO 7
680 PRINT"▓ ▓▌▔▔▔▔ ▓▌";:NEXT:PRINT"▀";
690 PRINT"▓ ▓▌  ▀▔▔▔▓ ▀"
700 PRINT"▓";TAB(34);"▓▁ ▀▓▌▌▌▓▌⌒▓▌▌ˇ
▔▔▔▓▓"
710 FOR I=1 TO 23:PRINT"▌▓ ▀▓";:NEXT
720 PRINT"▌▓ ▀";
730 POKE 2022,96:PRINT"▓"
740 FOR I=1 TO 19:PRINT"▓";:NEXT
750 PRINTSPC(16);"WRONG :"
760 PRINTTAB(23);"▔▔▔▔▔▔▔"
770 PRINT"▓▓▓▓▓";PR$
780 FOR I=1 TO 15:PRINT"▓";:NEXT
800 INPUT"▓▓▓▓▓▓▓1 LETTER           ▌▌▌▌▌
";G$
810 IF MID$(G$,2,1)=" " GOTO 880
820 PRINT"▓▓▓▓"
830 FOR I=1 TO 20
840 IF I/2=INT(I/2)THEN PRINT"▓";
850 PRINT"1 LETTER ONLY, ";NM$;"▓"
```

```
860 FOR J=1 TO 50:NEXT
870 NEXT I:GOTO 800
880 G$=LEFT$(G$,1)
890 IF G$>="A" AND G$<="Z" GOTO 950
900 PRINT"■■■■":FOR I=1 TO 20
910 IF I/2=INT(I/2)THEN PRINT"■";
920 PRINT"ONE LETTER !!■"
930 FOR J=1 TO 50:NEXT
940 NEXT I:GOTO 800
950 FOR I=1 TO LEN(LG$)
960 IF G$=MID$(LG$,I,1) GOTO 980
970 NEXT I:GOTO 1040
980 PRINT"■■■■"
990 FOR I=1 TO 20
1000 IF I/2=INT(I/2) THEN PRINT"■";
1010 PRINT"ALREADY GUESSED !■"
1020 FOR J=1 TO 50:NEXT
1030 NEXT I:GOTO 800
1040 PRINT"■■                    "
1050 F=0
1060 FOR I=1 TO LEN(WD$)
1070 IF G$=MID$(WD$,I,1) THEN PR$(I)=G$:F=1
1080 NEXT I
1090 IF F=0 GOTO 1540
1100 LG$=LG$+G$
1110 PR$=""
1120 FOR I=1 TO LEN(WD$)
1130 PR$=PR$+PR$(I)
1140 NEXT I
1150 PRINT"■■■■■■";PR$
1160 PRINT"                          ■"
1170 FOR I=1 TO 20
1180 IF I/2=INT(I/2) THEN PRINT"■";
1190 PRINT"VERY GOOD,"+NM$+"!■"
1200 FOR J=1 TO 50:NEXT
1210 NEXT I
1220 IF PR$=WD$ GOTO 1360
1230 PRINT"■■■■■■■■GUESS THE WORD "
1240 INPUT G$
1250 IF LEFT$(G$,1)<"A" OR LEFT$(G$,1)>"Z"
 THEN PRINT"■■ ":"3100
1260 G$=LEFT$(G$,LEN(WD$))
1270 IF G$=WD$ GOTO 1360
```

```
1280 PRINT"■■■■■■■■                              ┐"
1290 FOR I=1 TO 20
1300 IF I/2=INT(I/2) THEN PRINT"■";
1310 PRINT"I'M SORRY,"+NM$+"┐"
1320 FOR J=1 TO 50:NEXT
1330 NEXT I
1340 PRINT"■■■■■■■■■■■                           "
1350 GOTO 800
1360 PRINT"┌■■■■■■■■■■■
```

```
1700 PRINT"■"+HM$(J)+"■■■■■";
1710 NEXT J:PRINT"■    ";:NEXT I
1720 FOR I=1 TO 4:HP=HP+1:PRINT"■";
1730 FOR J=2 TO VP:PRINT"■";:NEXT
1740 IF VP=1 THENPRINT"■";
1750 PRINTSPC(HP)+"■■";
1760 FOR J=1 TO 8
1770 PRINT"■ "+HM$(J)+"■■■■■";
1780 NEXT J
1790 NEXT I
1800 IF M<8 GOTO 800
1810 PRINT"■";SPC(HP);
1820 FOR I=1 TO 8
1830 PRINT"■  "+HM$(I)+"■■■■■■";
1840 NEXT I
1850 GOTO800
1860 PRINT"■■■■■■■■■■■■";TAB(34);
1870 FOR I=1 TO 6
1880 FOR J=1 TO 4
1890 PRINTTD$(I,J)+A$;
1900 NEXT J
1910 PRINT"■■■■";
1920 NEXT I
1930 PRINT"■■■■";SPC(34);
1940 FORI=1 TO 16
1950 PRINT"■ ■  ";
1960 FOR J=3 TO 8
1970 PRINT A$+HM$(J);
1980 NEXT J
1990 PRINT"■■■■■■■■■■";
2000 NEXT I
2010 FOR I=1 TO 2000:NEXT
2020 PRINT"■";
2030 PRINT"■■  ■"+A$;
2040 PRINT"■ R  ■"+A$;
2050 PRINT"■ I+ ■"+A$;
2060 PRINT"■ P ■ ■"+A$;
2070 PRINT"■ ■ ■■ "+A$;;
2080 PRINT" ■  ■■ "+A$;
2090 PRINT" ■  ■■ "+A$;
2100 PRINT" ■  ■■ ";
2110 FOR I=1 TO 5000:NEXT
2120 PRINT"■■■■■■■■THE WORD WAS :"
```

```
2130 PRINT""+WD$
2140 PRINT" BETTER LUCK NEXT TIME, ";N
M$;"!!!"
2150 PRINT" AGAIN (Y/N) "
2160 GOTO 2170
2170 INPUT Q$:IF LEFT$(Q$,1)="N" THEN PRIN
T"THANKS FOR THE GAME !!":GOTO 2850
2180 RESTORE
2190 FOR I=1 TO 32:READ WD$:NEXT
2200 GOTO 450
2210 DATA"  (  "
2220 DATA"  )  "
2230 DATA"      "
2240 DATA" | |  "
2250 DATA" | |  "
2260 DATA"  |  "
2270 DATA"  |  "
2280 DATA"  |  "
2290 DATA"¯¯_"
2300 DATA"     "
2310 DATA"     "
2320 DATA"     "
2330 DATA"_    "
2340 DATA" _   "
2350 DATA"  _  "
2360 DATA"    _"
2370 DATA"\    "
2380 DATA" \   "
2390 DATA"  \  "
2400 DATA"     "
2410 DATA"|    "
2420 DATA" |   "
2430 DATA"  |  "
2440 DATA"   | "
2450 DATA"|    "
2460 DATA"|    "
2470 DATA" |   "
2480 DATA" |   "
2490 DATA"|    "
2500 DATA"|    "
2510 DATA"|    "
2520 DATA"|    "
2530 DATA CPU,ELCOMP,RAM,DISK,BYTE,PRINTER
```

```
2540 DATA "DATA",TERMINAL,DISK
2550 DATA ROM ,CHIP,KEYBOARD
2560 DATA INPUT,MODEM,RS232
2570 DATA SUBROUTINE,PLOTTER
2580 DATA SUBSCRIPT,BUS,PERIPHERALS
2590 DATA TRACTOR
2600 DATA VALENZUELA,FOOTBALL,BASKETBALL
2610 DATA STADIUM,RUGBY,GOAL,SKI
2620 DATA POLO,VOLLEYBALL
2630 DATA ADIDAS,RUN,CHESS
2640 DATA JUMP,SWIMMING
2650 DATA CARRACE,HORSE,RIDE
2660 DATA WALK,MOUNTAINEERING
2670 DATA CYCLING
2680 DATA PORSCHE,VOLVO,VOLKSWAGEN
2690 DATA DAIMLER,BMW,LOTUS,TRIUMPH
2700 DATA FIAT,ROLLSROYCE,VW,OPEL
2710 DATA TEMPO,SUBARU,FORD,CAPRI
2720 DATA BUGGY,HONDA,MAZDA
2730 DATA BUGATTI,FERRARI
2740 DATA USSR,AMERICA,FRANCE,SPAIN
2750 DATA BAVARIA,GERMANY,RUSSIA,ITALY
2760 DATA GREECE,AEGYPT,RHODESIA,CHILE
2770 DATA SINGAPORE,JAPAN,INDIA,CANADA
2780 DATA GDR,UGANDA,YUGOSLAVIA,HONGKONG
2790 DATA PIZZA,ELCOMP,DINNER
2800 DATA TALK,ELCOMP,MAHOGANY,THING
2810 DATA BREAD,LAZY,EYE,RIM
2820 DATA VILLAGE,MUG,BEAST,ALMOND,MAY
2830 DATA SENDER,EXAMPLE,KING
2840 DATA SPHYNX
2850 END
```

NOTES

Shooting Gallery

16

This is an enjoyable shooting game with sound. A firing base moves up and down on the left side of the screen. On the right side is a wall with up to three holes. If you hit a hole you get 100 points. If you miss the hole then 10 points will be subtracted from your score. One game is five rounds. At the end of the game the total score is displayed.

```
100 REM SHOOTING GALERY
110 REM ELCOMP PUBLISHING INC.
180 POKE53281,1:POKE53280,2
200 CLR
210 DIM Z(23)
220 PRINT"■■■■              ■SHOOTING GALERY■
"
230 PRINT"          ■■■■PRESS KEY 1 TO FIRE
"
240 PRINT"■■■■    ,       PRESS ANY KEY TO STA
RT"
250 GETO$:IFO$=""GOTO250
260 PRINT"■
270 A$(0)=" ■■■■■■■■■■■■■"
280 A$(1)="■■ ■■■■■■■■■■■"
290 D$(0)="×"
300 D$(2)=" "
305 PRINTCHR$(144)
310 G$(0)="■":G$(1)=" "
330 PRINT"■"
340 T=T+S
```

```
350 K=1:X=1:S=100:C=10:R=R+1
360 R$=STR$(R)
370 IFR=5GOTO1040
380 FORI=0TO 22:PRINT" ":Z(I)=0:NEXT
390 FORI=1TO4
400 Z(INT(RND(1)*19+2))=1
410 NEXT
420 PRINT"▒"
430 FORI=1TO21
440 PRINTTAB(37);G$(Z(I))
450 NEXT
460 PRINT"          ▒ROUND■          ▒COUNT■         ▒
SCORE"
470 PRINT"          | ";R$;" |          | 10 |         |
100 |"
480 PRINT"          ________        ________       ________
";
490 PRINT"▒"
500 K=1
510 K=ABS(K-1):X=1
520 I=1
530 PRINTA$(K)
540 GET A$
550 IFA$="1"THENGOSUB640
560 IFC=0GOTO330
570 I=I+1
580 IFI=19GOTO510
590 GOTO530
600 V=54296:Q=54276:A=54277:H=54273:L=5427
2
605 FOR M=15 TO 0 STEP -1:POKEV,M:POKEQ,12
9:POKEA,15:POKEH,40:POKEL,200:NEXT
610 POKE Q,0:POKEA,0
620 RETURN
640 PRINT"▒▶▶";
650 Y=36
660 IFK=0THENW=I+2:GOTO680
670 W=20-I
680 IFZ(W)>0THENY=38
690 PRINT"▌ ●";
700 X=X+1
710 IFX<>YGOTO690
720 IFX=36THEN PRINT"▌ ▶▌";:GOSUB600:GOTO 840
```

```
730 Z(W)=Z(W)+1
740 FORJ=1TO4
750 PRINT"■■■■";
760 L=54272:H=54273:V=54296:A=54277:Q=5427
6
770 POKEV,15:POKEQ,33:POKEA,16
780 FOR M=0 TO 100:POKEL,M:POKEH,M :NEXT M

790 PRINT"■■";
800 POKE V,0:POKEA,0
810 REM   FORM=1TO20:NEXT
820 NEXT
830 S=S+120
840 S=S-5*(38-X)
850 REM  POKE59467,0
860 S=S-Z(W)*10
870 C=C-1
880 FORJ=1TO23-W
890 PRINT
900 NEXT
910 IFS<0THENS=0
920 S$=STR$(S):C$=STR$(C)
930 PRINTTAB(18);"  ■■■■";C$;TAB(28);RIGHT$
(S$,3)
940 PRINT"■"
950 FORJ=1TOW:PRINT"■";:NEXT
960 PRINT"■■■";D$(38-X);
970 IFX<>38GOTO1010
980 V=54296:Q=54276:A=54277:H=54273:L=5427
2
985 POKE V,15:POKE Q,17:POKE A,15
990 FOR M=100 TO 5 STEP-2:POKEH,40:POKE L,
M:NEXT
1000 FOR M=75  TO 5 STEP-2:POKE H,40:POKEL
,M:NEXT
1010 POKEQ,0
1020 X=1:PRINT"■■ ■■[■]"
1030 RETURN
1040 PRINT"■"
1050 REM POKE59467,16
1070 PRINT"■■■"
1080 FORJ=1TO3
1090 PRINTTAB(11);"** GAME IS OVER"
```

```
1100 L=54272:H=54273:V=54296:A=54277:Q=542
76
1110 POKEV,15:POKEQ,17:POKEA,4
1120 FOR M=2 TO130 STEP RND(1)*15:POKEL,M:
POKEH,M:NEXT
1130 PRINTTAB(11);"■■GAME IS OVER*■■"
1140 POKEV,0:POKE A,0
1150 REM
1160 REM
1170 NEXT
1180 PRINT:PRINT
1190 FORH=1TO39:PRINT"◆";:NEXT:PRINT
1200 REM   POKE59467,0:POKE59466,0
1210 PRINT"■■■■YOU HAD 40 SHOTS AT 4 AIMS"

1220 PRINT"■TOTAL SCORE IS : ";T
1270 INPUT"AGAIN (Y/N) ";A$
1280 IF A$= "Y"THEN100
1290 PRINT"■■BYE BYE !":END
```

17 Reversi

This game is played on an 8x8 field. In the beginning there are 4 stones on the playfield. Try to place new stones so that they surround the computer's stone, either horizontal, vertical, or diagonal. If you surround the computer's stones, they are converted into your color. The winner is the one with the most stones when the whole playfield is filled with stones.

```
110 DN$="
120 FORI=1TO39:E$=E$+" ":NEXT
130 FORI=1TO39:E$=E$+"":NEXT
140 POKE53281,1:POKE53280,5
150 R$="
    "
160 DIMA(9,9),I4(8),J4(8),D$(2)
180 PRINT"INSTRUCTIONS (Y/N) ";
190 INPUT X$
200 IF LEFT$(X$,1)="N"THEN480
210 PRINT"NA$" THIS GAME IS PLAYED ON AN
 8 X 8 FIELD"
220 PRINT"ROWS 1 THRU 8 AND COLUMNS A
 THRU "
230 PRINT"IN THE BEGINNING THERE ARE 4 STO
NES"
240 PRINT"IN THE CENTER OF THE PLAYFIELD"
250 PRINT"TRY TO PLACE NEW STONES SO THAT
IT"
260 PRINT"INCLUDES MY STONES, HORIZONTAL,V
ERTICAL,"
270 PRINT"OR DIAGONAL. THEY BECOME YOUR ST
ONES"
```

```
280 PRINT"IF, LIKE IN THIS EXAMPLE
290 PRINT"    ──┼──┼──┼──┼──"
300 PRINT"     | o | o | o | o | ●"
310 PRINT"    ──┼──┼──┼──┼──"
320 PRINT"YOU CONVERT THE WHITE STONES INT
O"
330 PRINT"BLACK ONES OR VICE VERSA."
340 I=TI:J=1:PRINT"SQQQQQQQQQQQQ]]]]▌";
350 IF(TI-I)>1200THEN390
360 IFJ=1THENPRINT"●▌";:GOTO380
370 PRINT" ▌";
380 J=-1*J:FORK=1TO150:NEXT:GOTO350
390 PRINT"SQQQQQQQQQQQQQ]]]▌ ● | ● | ● | ● | ●
"
400 PRINT"ENTER A NUMBER FOR A ROW AND A L
ETTER"
410 PRINT"FOR A COLUMN, SEPARATED BY A COM
MA"
420 PRINT"AT LEAST ONE STONE HAS TO BE CON
VERTED"
430 PRINT"IF THIS IS NOT POSSIBLE ENTER 92
,A"
440 PRINT"TO PASS"
470 F2=0
480 PRINT"SHOULD I TRY HARD (Y/N) ";
490 S2=0
500 INPUTX$
510 IFLEFT$(X$,1)="N"THEN530
520 S2=2
530 B=-1:W=1
540 D$(B+1)="o"
550 D$(0+1)=" "
560 D$(W+1)="●"
570 FORK=1TO8
580 READI4(K),J4(K)
590 NEXT
600 FORI=0TO9:FORJ=0TO9
610 A(I,J)=0
620 NEXTJ,I
630 A(4,4)=W
640 A(5,5)=W
650 A(4,5)=B
660 A(5,4)=B
```

```
670 C1=2:H1=C1:N1=4:Z=0
680 PRINT"DO YOU WANT BLACK OR WHITE (B/W)
 ";
690 C=W:H=B
700 INPUTX$
710 IFLEFT$(X$,1)="W"THEN730
720 C=B:H=W
730 PRINT"DO YOU WANT TO START ";
740 INPUTX$
750 PRINT"□";
760 GOSUB2160
770 IFLEFT$(X$,1)="Y"THEN1140
780 PRINTDN$;E$"I'M THINKING !"
790 B1=-1:I3=0:J3=0:T1=C:T2=H
800 FORI=1TO8:FORJ=1TO8
810 IF A(I,J)<>0THEN950
820 GOSUB1830
830 IFF1=0THEN950
840 U=-1
850 GOSUB1910
860 IFS1=0THEN950
870 IF(I-1)*(I-8)<>0THEN890
880 S1=S1+S2
890 IF(J-1)*(J-8)<>0THEN910
900 S1=S1+S2
910 IFS1<B1THEN950
920 IFS1>B1THEN940
930 IFRND(1)>0.5THEN950
940 B1=S1:I3=I:J3=J
950 NEXTJ,I
960 IFB1>0THEN1010
970 PRINTDN$"■"E$"I PASS ! YOUR TURN"
980 IFZ=1THEN1490
990 Z=1
1000 GOTO1140
1010 Z=0
1020 PRINTDN$"■"E$"I GO TO  ■"RIGHT$(STR$(
I3),1)"■ ■"CHR$(J3+64)
1030 GOSUB2440
1040 I=I3:J=J3:U=1
1050 GOSUB1910
1060 C1=C1+S1+1
1070 H1=H1-S1
```

```
1080 N1=N1+1
1090 PRINTDN$"■■"E$"I GET  ";
1100 PRINTS1;
1110 PRINT" OF YOUR STONES"
1120 GOSUB2160
1130 IFH1=0ORN1=64THEN1490
1140 T1=H:T2=C
1150 PRINTDN$;E$"IT'S YOUR TURN -- ■ROW■ ■
COL  ";
1160 GOSUB2320
1170 IFI<>0THEN1240
1180 PRINTDN$;E$"DO YOU WANT TO PASS (Y/N)
 ";
1190 INPUTX$
1200 IFLEFT$(X$,1)<>"Y"THEN1150
1210 IFZ=1THEN1490
1220 Z=1
1230 GOTO790
1240 IF A(I,J)=0THEN1270
1250 PRINTDN$"■"E$"I'M SORRY, OCCUPIED, TR
Y AGAIN !"
1260 GOTO1350
1270 GOSUB1830
1280 IFF1=1THEN1310
1290 PRINTDN$"■"E$"NOT RIGHT NEXT TO MY ST
ONES !"
1300 GOTO1350
1310 U=-1
1320 GOSUB1910
1330 IFS1>0THEN1370
1340 PRINTDN$"■"E$"THIS IS NOT ACCORDING T
O RULES !"
1350 PRINTE$
1360 GOTO1150
1370 Z=0
1380 PRINTDN$"■"E$"YOU GET ";
1390 PRINTS1;
1400 PRINT" OF MY STONES":PRINTE$
1410 U=1
1420 GOSUB1910
1430 H1=H1+S1+1
1440 C1=C1-S1
1450 N1=N1+1
```

```
1460 GOSUB2160
1470 IFC1=0ORN1=64THEN1490
1480 GOTO790
1490 PRINTDN$;E$:PRINTE$:PRINTE$
1500 PRINTDN$;E$"YOU HAVE "H1"PIECES"
1510 PRINT"I HAVE "C1"PIECES"
1520 IFH1=C1THEN1560
1530 IFH1>C1THEN1580
1540 PRINT"I WON !!"
1550 GOTO1590
1560 PRINT"NOT EASY !!"
1570 GOTO1770
1580 PRINT"YOUR VICTORY !"
1590 C1=C1-H1
1600 IFC1>0THEN1620
1610 C1=-C1
1620 C1=(64*C1)/N1
1630 PRINT"THIS WAS ";
1640 IFC1<11THEN1760
1650 IFC1<25THEN1740
1660 IFC1<39THEN1720
1670 IFC1<53THEN1700
1680 PRINT"A GOOD GAME."
1690 GOTO1770
1700 PRINT"TOO SIMPLE."
1710 GOTO1770
1720 PRINT"A FIGHT"
1730 GOTO1770
1740 PRINT"A HOT GAME"
1750 GOTO1770
1760 PRINT"A RACE !"
1770 PRINT
1780 PRINT"AGAIN (Y/N) ";
1790 INPUTX$
1800 IFLEFT$(X$,1)="Y"THEN600
1810 PRINT"THANKS FOR THE GAME."
1820 STOP
1830 F1=0
1840 FORI1=-1TO1
1850 FORJ1=-1TO1
1860 IFA(I+I1,J+J1)=T2THEN1890
1870 NEXTJ1,I1
1880 RETURN
```

```
1890 F1=1
1900 RETURN
1910 S1=0
1920 FORK=1TO8
1930 I5=I4(K)
1940 J5=J4(K)
1950 I6=I+I5
1960 J6=J+J5
1970 S3=0
1980 IFA(I6,J6)<>T2THEN2140
1990 S3=S3+1
2000 I6=I6+I5
2010 J6=J6+J5
2020 IFA(I6,J6)=T1THEN2050
2030 IFA(I6,J6)=0 THEN2140
2040 GOTO1990
2050 S1=S1+S3
2060 IFU<>1THEN2140
2070 I6=I
2080 J6=J
2090 FORK1=0TO83
2100 A(I6,J6)=T1
2110 I6=I6+I5
2120 J6=J6+J5
2130 NEXTK1
2140 NEXTK
2150 RETURN
2160 PRINT"■"TAB(9)"  ";:FORI=1TOLEN(NA$):
PRINTMID$(NA$,I,1)"  ";:NEXT:PRINT
2170 PRINT"■     A   B   C   D   E   F   G
   H    "
2180 PRINT"    ┌───┬───┬───┬───┬───┬───┬───
┬───┐"
2190 FORI=1TO8
2200 PRINTI"| ";
2210 FORJ=1TO8
2220 PRINTD$(A(I,J)+1)" | ";
2230 NEXTJ
2240 PRINT
2250 IFI<>8THENPRINT"    ├───┼───┼───┼───┼
──┼───┼───┼───┤
2260 NEXTI
2270 PRINT"    └───┴───┴───┴───┴───┴───┴───
┴───┘"
```

```
2280 RETURN
2290 END
2300 REM SUBROUTINE INPUT
2310 PRINTDN$"■"E$"WRONG; TRY AGAIN."
2320 I=-1:J=-1:K=1
2330 GETX$:IFX$<>""THEN2390
2340 IFK=1THENPRINT"▒■";:GOTO2360
2350 PRINT" ■";
2360 K=-1*K
2370 FORL=1TO200:NEXT
2380 GOTO2330
2390 G=ASC(X$)
2400 IF47<GANDG<58THENI=G-48:PRINT"■"X$"■
";
2410 IF64<GANDG<74THENJ=G-64:PRINT"■"X$"■
";
2420 IFI<>-1ANDJ<>-1THENRETURN
2430 GOTO2330
2440 REM BLINKING
2450 PRINTLEFT$(DN$,2*(I3-1)+5);LEFT$(R$,4
*(J3-1)+5);
2460 K=1:M=0:X$=D$(C+1)
2470 IFK=1THENPRINTX$"■";:GOTO2490
2480 PRINT" ■";
2490 K=-1*K
2500 FORL=1TO200:NEXT
2510 IFM>9THENRETURN
2520 M=M+1:GOTO2470
2530 DATA 0,1,-1,1,-1,0,-1,-1,0,-1,1,-1,1,
0,1,1
```

NOTES

Biorhythm 18

This program calculates your physical, emotional, and intellectual condition, as well as the average of these three, for any given day or month.

```
50 REM  BIORHYTHM FOR C-64
100 DIMX$(31)
105 DIMM$(12)
110 M$(1)="JAN"
111 M$(2)="FEB"
112 M$(3)="MAR"
113 M$(4)="APR"
114 M$(5)="MAY"
115 M$(6)="JUN"
116 M$(7)="JUL"
117 M$(8)="AUG"
118 M$(9)="SEP"
119 M$(10)="OCT"
120 M$(11)="NOV"
121 M$(12)="DEC"
200 D1=2*π/23
210 D2=2*π/28
220 D3=2*π/33
500 PRINT"■"
510 PRINT"■ENTER BIRTHDAY (MM,DD,YY)"
511 PRINT:INPUT M2,T1,J3
520 IFJ3>100THENJ3=J3-1900
525 IFJ3<1THEN6000
526 IFM2>12THENGOSUB6030:GOTO510
530 FORQ=1TOM2:READX:NEXTQ
532 IFT1>XTHENGOSUB6050:GOTO510
534 IFM2=2THENIFT1>28THENJJ=J3:GOSUB6070:I
FFL=1THENFL=0:GOTO510
```

```
535 N1=X-T1
536 GOSUB5000
540 READW
541 READE:E=E-(1AND(J3-INT(J3/4)*4<>0))
542 READR
543 READT
544 READY
545 READU
546 READI
547 READO
548 READP
549 READA
550 READS
560 F1=N1+W+E+R+T+Y+U+I+O+P+A+S
562 RESTORE
630 GOTO710
631 READD
632 READF
633 READG
634 READH
635 READJ
636 READK
637 READL
638 READM
639 READN
640 READB
641 READV
650 L1=D+F+G+H+J+K+L+M+N+B+V
660 P1=C3-J3-1
670 P1=P1*365.25
680 IFJ$="D"THEN4000
690 A1=.25
700 G1=INT(A1+F1+P1+L1)
705 GOTO800
710 PRINT"■BIORHYTHM FOR A DAY OR A MONTH
(D/M)"
720 INPUTJ$
725 IFJ$="D"THEN772
730 IFJ$="M"THEN740
735 PRINT"■■■■WRONG INPUT !":GOTO710
740 PRINT"■WHEN SHOULD I START ? MONTH,YEAR
745 PRINT:INPUT C1,C3
750 IFC3>100THENC3=C3-1900
```

```
752 IFC1>12THENGOSUB6030:GOTO740
755 IFJ3>C3THEN6100
756 IFJ3=C3THEN760
758 GOTO3000
760 IFM2>C1THEN6100
770 GOTO3000
772 PRINT:INPUT"MONTH,DAY,YEAR";C1,C2,C3
773 IFC1>12THENGOSUB6030:GOTO772
774 IFC3>100THENC3=C3-1900
775 IFJ3>C3THEN6100
776 IFJ3=C3THEN780
778 GOTO3000
780 IFM2=>C1THEN785
783 GOTO3000
785 IFT1>C2THEN6100
795 GOTO3000
800 J4=J3+1900
970 PRINT"■
978 PRINT"■P■=PHYSICAL"
979 PRINT"■E■=EMOTIONAL"
980 PRINT"■I■=INTELLECTUAL"
990 PRINT"A=AVERAGE"
993 RESTORE:FORQ=1TOC1:READX:NEXTQ:IFC1=2T
HENX=X-(1AND(C3-INT(C3/4)*4<>0))
995 L=0
997 GOSUB2000
998 D=0
1000 L=L+1
1100 FORZZ=1TO31:X$(ZZ)=" ":NEXT
1130 X$(16)="|"
1210 Y1=INT(15*SIN((G1+L)*D1)+16)
1215 Y2=INT(15*SIN((G1+L)*D2)+16)
1220 Y3=INT(15*SIN((G1+L)*D3)+16)
1230 Y4=(Y1+Y2+Y3)/3
1250 X$(Y1)="■P■"
1260 X$(Y2)="■E■"
1270 X$(Y3)="■I■"
1280 X$(Y4)="A"
1350 D=D+1
1360 IFD<X+1THEN1398
1361 GOTO7000
1398 REM
1400 PRINTM$(C1);""TAB(8);
```

```
1450 FORJ=1TO31:PRINTX$(J);:NEXTJ
1500 PRINT
1600 GOTO1000
2000 REM
2020 PRINT
2030 C4=C3+1900
2040 PRINT"BIORHYTHM FOR ";M$(C1);" ";C4
2100 PRINT
2165 PRINT"           ■POOR■       ■MEDIUM■
     ■■■■■"
2166 PRINT
2190 D=1
2200 RETURN
3000 IFC1=2THEN641
3001 IFC1=3THEN640
3002 IFC1=4THEN639
3003 IFC1=5THEN638
3004 IFC1=6THEN637
3005 IFC1=7THEN636
3006 IFC1=8THEN635
3007 IFC1=9THEN634
3008 IFC1=10THEN633
3009 IFC1=11THEN632
3010 IFC1=12THEN631
3012 IFC1=1THEN660
3020 GOTO631
4000 READX:IFC2>XTHENGOSUB6050:GOTO772
4001 IFC1=2THENIFC2>28THENJJ=C3:GOSUB6070:
IFFL=1THENFL=0:GOTO772
4002 IFC1>2THENIFC3-INT(C3/4)*4<>0THENL1=L
1-1
4003 L1=L1+C2:IFC3<100THENC3=C3+1900
4004 A1=.25
4005 G1=INT(F1+P1+L1+A1)
4006 PRINT"■■BIORHYTHM FOR ";M$(C1);C2;C3
4010 PRINT"■■NUMBER OF DAYS SINCE BIRTH",G
1
4015 PRINT
4016 Y1=SIN(2*π*G1/23)
4017 Y2=SIN(2*π*G1/28)
4018 Y3=SIN(2*π*G1/33)
4019 U1=((Y1*15)+16)
4020 U2=((Y2*15)+16)
```

```
4021 U3=((Y3*15)+16)
4022 O$(1)="■MEDIUM■    "
4025 O$(2)="■POOR■      "
4029 O$(3)="■GOOD■      "
4030 T1=1
4031 IFU1=<11THENT1=2
4032 IFU1=>21THENT1=3
4033 T2=1
4034 IFU2=<11THENT2=2
4035 IFU2=>21THENT2=3
4036 T3=1
4037 IFU3=<11THENT3=2
4038 IFU3=>21THENT3=3
4040 X1=(INT(Y1*1000))/1000
4041 X2=(INT(Y2*1000))/1000
4042 X3=(INT(Y3*1000))/1000
4044 PRINT"■■PHYSICAL          ";O$(T1),X1
4045 PRINT"■■EMOTIONAL         ";O$(T2),X2
4050 PRINT"■■INTELLECTUAL      ";O$(T3),X3
4054 Y4=(Y1+Y2+Y3)/3
4055 U4=(Y4*15)+16
4056 T4=1
4057 IFU4=<11THENT4=2
4058 IFU4=>21THENT4=3
4059 X4=(INT(Y4*1000))/1000
4060 PRINT"■■AVERAGE           ";O$(T4),X4
4070 GOTO7000
5000 IFM2=1THEN540
5001 IFM2=2THEN541
5003 IFM2=3THEN542
5004 IFM2=4THEN543
5005 IFM2=5THEN544
5006 IFM2=6THEN545
5007 IFM2=7THEN546
5008 IFM2=8THEN547
5009 IFM2=9THEN548
5010 IFM2=10THEN549
5011 IFM2=11THEN550
5012 IFM2=12THEN562
5013 RETURN
6000 PRINT"■"
6005 PRINT"WRONG INPUT !
6006 PRINT
```

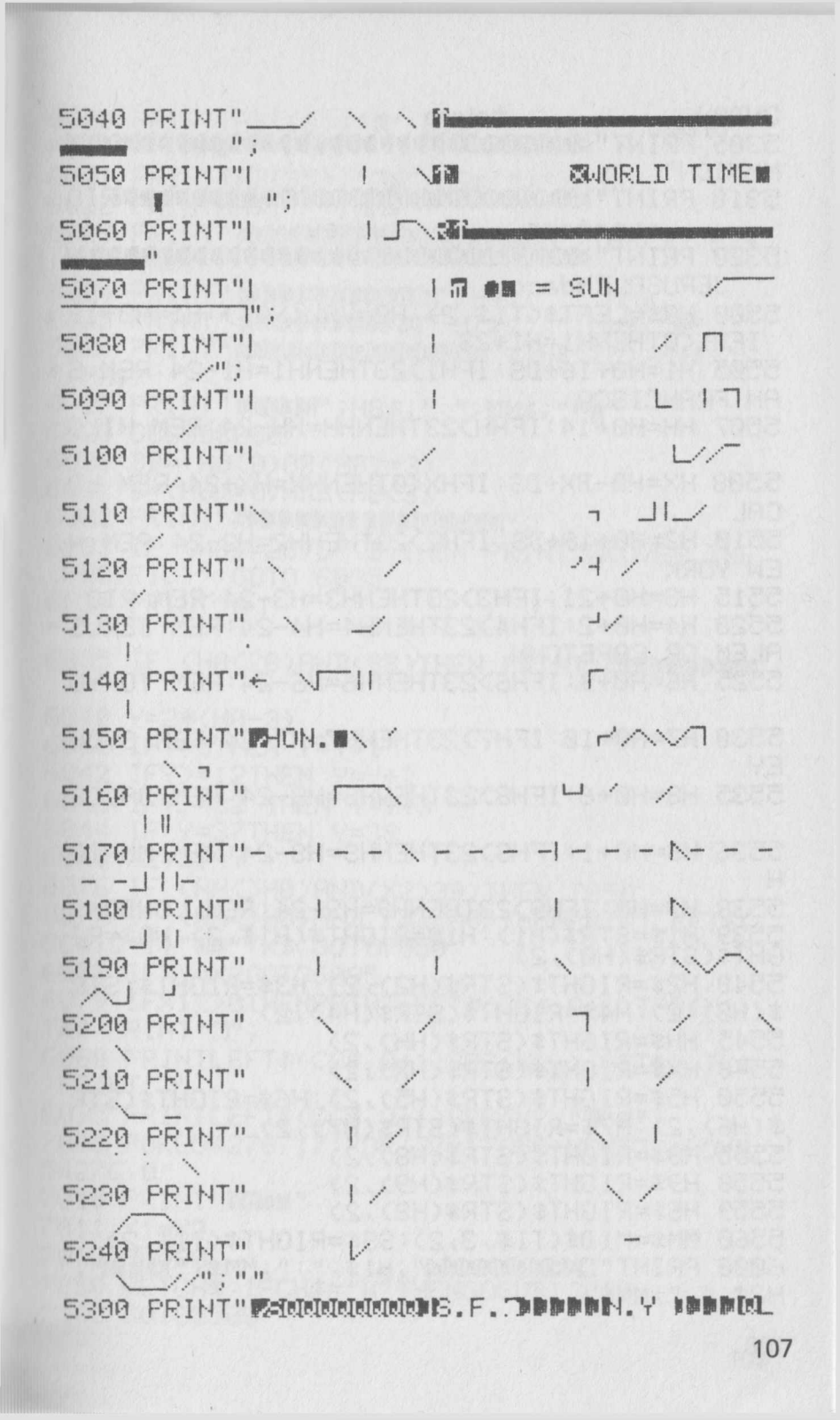
```
6010 PRINT"YEAR HAS TO BE PAST 1900 !
6020 GOTO510
6030 PRINT"□■■■A YEAR ONLY HAS 12 MONTHS!!"
6040 PRINT:PRINT:PRINT:RETURN
6050 PRINT"□■■■THAT MONTH ONLY HAS";X;" DA
YS!!"
6055 PRINT:PRINT:PRINT:RESTORE:RETURN
6070 IFJJ-INT(JJ/4)*4=0THENFL=0:RETURN
6075 PRINT"□■■■THAT YEAR IS NOT A LEAPYEAR
!!"
6080 PRINT:PRINT:PRINT:FL=1:RESTORE:RETURN

6100 REM
6110 PRINT"□"
6111 PRINT:PRINT
6115 PRINT"THE START DATE HAS TO BE PAST
6116 PRINT
6120 PRINT"THE BIRTH DATE!!
6121 GOTO710
7000 PRINT"■■PRESS ANY KEY FOR NEW BIORHYT
HM
7020 GETA$:IFA$=""THEN7020
7030 PRINT"□":RUN
9000 DATA 31,29,31,30,31,30,31
9010 DATA 31,30,31,30,31
```

Worldtime 19

This program draws a worldmap and displays the time for several cities in different time zones. In addition to that, the position of the sun is shown, depending on the time of day and the season. The time has to be entered in the military form (0 through 24).

```
1 CITY$=" = PUBLIC DOMAIN"
2 DOWN=7
3 ACROSS=7
4 POKE53280,1:POKE53281,1:REM  64
5 PRINT"■QQQQQQQQQ]]]]]]]]]]PLEASE ENTER DAT
E
9 OPEN1,3
10 DIM DM(12):CC$="■QQQQQQQQQQQQQQQQQQQQQQQQ
"
11 PRINT:PRINT:PRINT"MONTH       DAY
YEAR
12 PRINT" | |        ||        ||
13 PRINT" | └────┐||┌─────┘ |
14 PRINT"  └──────┐||||┌──────┘
15 PRINT"          ||||||
16 PRINT"
17 PRINTSPC(7):
18 INPUTDT$
50 POKE54296,15:POKE54273,66:POKE54278,176
:POKE54277,12
100 PRINT"QQQQQQQQQ]]]]]]]]]]PLEASE ENTER TI
ME
```

```
110 PRINT:PRINT:PRINT"HOURS       MINUTES    S
ECONDS
120 PRINT" | |           ||           | |
130 PRINT" | ╰──────────╮||╭──────────╯ |
140 PRINT" ╰──────────╮||||╭──────────╯
150 PRINT"            ||||||
160 PRINT"
170 PRINTSPC(7):
180 INPUTLT$
185 GOSUB 12000
190 GOSUB11000
225 GET B$:IF B$="" GOTO 225
230 IF B$="C"THEN B=230000:N=23
247 IFB$="O" THEN GOSUB11050
250 NX=B:T=VAL(LT$)+B-DS*10000:IFT>240000T
HENT=T-240000
255 BX=B/10000
260 T$="000000"+MID$(STR$(T),2)
265 TI$=RIGHT$(T$,6)
300 MM$=LEFT$(DT$,2):DD$=MID$(DT$,3,2):YY$
=RIGHT$(DT$,2)
310 MM=VAL(MM$):DD=VAL(DD$):YY=VAL(YY$)
320 IFMM=1THEN390
330 FORI=1TO12
340 READ DM(I)
345 NEXTI
350 IF Y/4=INT(Y/4)THEN DM(2)=29
360 FOR I=1TOMM-1
370 JD=JD+DM(I)
380 NEXTI
390 JD=JD+DD
400 DATA 31,28,31,30,31,30,31,31,30,31,30,
31
410 IFMM=6THENQ=11
420 IF (MM=7)OR(MM=5)THENQ=12
430 IF (MM=8)OR(MM=4)THENQ=13
440 IF (MM=9)OR(MM=3)THENQ=14
450 IF (MM=10)OR(MM=2)THENQ=15
460 IF (MM=11)OR(MM=1)THENQ=16
470 IF (MM=12)THENQ=17
480 IF (Q=0)THENSTOP
5000 PRINT"⊐
```



```
ONDON         tokyo
5305 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■
MUNICH"
5310 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■RIO
     capetown        sydney
5320 PRINT"■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■■
  JERUSALEMdacca
5500 H0$=LEFT$(TI$,2):H0=VAL(H0$):H1=H0+19
:IFH1<0THENH1=H1+23
5505 H1=H0+16+DS:IFH1>23THENH1=H1-24:REM S
AN FRANCISCO
5507 HH=H0+14:IFHH>23THENHH=HH-24:REM HILO
5508 HX=H0-BX+DS:IFHX<0THENHX=HX+24:REM LO
CAL
5510 H2=H0+19+DS:IFH2>23THENH2=H2-24:REM N
EW YORK
5515 H3=H0+21:IFH3>23THENH3=H3-24:REM RIO
5520 H4=H0+2:IFH4>23THENH4=H4-24:REM JERUS
ALEM OR CAPETOWN
5525 H6=H0+9:IFH6>23THENH6=H6-24:REM TOKYO
5530 H7=H0+10:IFH7>23THENH7=H7-24:REM SYDN
EY
5535 H8=H0+6:IFH8>23THENH8=H8-24:REM DACCA
5536 HS=H0+1:IFHS>23THENHS=HS-24:REM MUNIC
H
5538 H9=H0:IFH9>23THENH9=H9-24:REM LONDON
5539 H1$=STR$(H1):H1$=RIGHT$(H1$,2):HO$=RI
GHT$(STR$(H0),2)
5540 H2$=RIGHT$(STR$(H2),2):H3$=RIGHT$(STR
$(H3),2):H4$=RIGHT$(STR$(H4),2)
5545 HH$=RIGHT$(STR$(HH),2)
5548 HX$=RIGHT$(STR$(HX),2)
5550 H5$=RIGHT$(STR$(H5),2):H6$=RIGHT$(STR
$(H6),2):H7$=RIGHT$(STR$(H7),2)
5555 H8$=RIGHT$(STR$(H8),2)
5558 H9$=RIGHT$(STR$(H9),2)
5559 HS$=RIGHT$(STR$(HS),2)
5560 MM$=MID$(TI$,3,2):SS$=RIGHT$(TI$,2)
6000 PRINT"■■■■■■■■■■■";H1$;":";MM$;"■■■■";
H2$;":";MM$
```

```
6020 PRINTTAB(18);"■";H9$;":";MM$;"■■■■■";
HS$;":";MM$
6021 PRINTTAB(35);"■■";H6$;":";MM$;
6022 PRINTHH$;":";MM$
6023 PRINT"■■■■■■■■■■■■■■■■■■■■■";TAB(9);H3$
;":";MM$;
6024 PRINT"■■■■■■■■■■■■";H4$;":";MM$;
6025 PRINT"■■■■■■■■■■";H7$;":";MM$;"■"
6026 PRINT"■■■■■■■■■■■■■■■■■■■";TAB(23);H4$;":
";MM$;
6027 PRINT"■■■■■";H8$;":";MM$;"■■"
6028 GOSUB8000
6030 BB=(H0<0)OR(H0>=3)
6031 B=(H0>=0)AND(H0<3)
6032 PRINT"■■■■■■■■■■■■■■■■";
6033 IF (H0>=20)OR(B)THEN PRINT"■(OVER THE
 PACIFIC)":GOTO 6035
6034 PRINT"■ |                   /  ⊓         /
"
6035 IF (H0<20)AND(BB)THEN PRINT"■■■■■■■■■
                                      "
6040 Y=2*(H0-3)
6041 IFY=0THEN Y=Y+1
6042 IFY>=12THEN Y=Y+2
6043 IFY>=32 THEN Y=Y+3
6044 IF Y=37THEN Y=38
6045 X2=39-Y
6076 IF (HH<>H0)AND(X2>39)THEN 7050
6077 IF (HH<>H0)AND (X2<=0)THENPRINTLEFT$(
CC$,Q+1)"■■"TK$:GOTO7050
6078 IFX1=X2GOTO6095
6079 IFX1<>0THENPRINTLEFT$(CC$,Q+1)TAB(X1)
TK$:PRINT"■";
6080 PRINTLEFT$(CC$,Q+1)SPC(X2);:GET#1,TK$
:PRINT"■"
6095 PRINTLEFT$(CC$,Q+1)SPC(X2)"■o■";
7000 POKE54276,17:FOR ZZ=1TO50:NEXTZZ:POKE
54276,0
7010 PRINT"■■■■";
7011 X1=X2
7012 HH=H0
7050 GETCH$:IFCH$="W"THENGOSUB13000
7100 GOTO5500
```

```
8000 PRINTLEFT$(CC$,DOWN+1)TAB(ACROSS)
8010 PRINT""
8020 PRINT"";HX$;":";MM$;":";SS$;"";"
(TZ=";N;") ";
8030 IF DS THENPRINT"(SUMMERTIME)";:GOTO
8050
8040 PRINT"(NORMAL TIME)";
8050 PRINT""
8060 RETURN
10040 INPUTN
10050 B=N*10000
10060 RETURN
11000 PRINT"ENTER TIMEZONE
"
11010 PRINT:PRINT"PRESS C FOR CENTRAL EU
ROPEAN TIME
11045 PRINT:PRINT"ENTER O IF OTHER TIME
ZONE":RETURN
11050 PRINT"ENTER NUMBER OF HOURS TO BE A
DDED
11060 PRINT:PRINT"TO GREENWICH TIME IN DIR
ECTION
11070 PRINT:PRINT"WEST TO GET THE LOCAL TI
ME
11090 PRINT:PRINT"(I.E. GREENLAND=3,JAPAN=
15,MUNICH=23)
11100 INPUTN
11110 B=N*10000
11120 RETURN
12000 REM DAYLIGHT SAVINGS
12010 PRINT""
12020 PRINT"DAYLIGHT SAVINGS TIME (Y/N)?"
12030 GET DS$:IF DS$="" GOTO12030
12040 DS=0
12050 IF DS$="Y"THEN DS=1
12060 RETURN
13000 INPUT"";LT$
13100 PRINT"                "
13250 B=NX:T=VAL(LT$)+B-DS*10000:IFT>24000
0THENT=T-240000
13255 BX=B/10000
13260 T$="000000"+MID$(STR$(T),2)
13265 TI$=RIGHT$(T$,6):RETURN
```

Reaction 20

This program tests your reaction time. Hit a key as soon as the word 'GO !' appears on the screen, but don't hit the key too early because the computer will know you're cheating. Your reaction time and the average time will be displayed after each try.

```
1 POKE53281,2:POKE53280,5:PRINTCHR$(5)
2 GOSUB200
3 B$="     ": DUMMY=RND(-TI)
4 PRINT"THIS PROGRAM TESTS YOUR REACTION T
IME"
5 PRINT"■PRESS ANY KEY WHEN THE WORD"
6 PRINT"■■GO !■ APPEARS."
7 PRINT"■YOUR REACTION TIME AND YOUR"
8 PRINT"AVERAGE TIME WILL BE DISPLAYED."
15 PRINT"■■ PRESS 'Y' WHEN READY"
16 GET RE$: IF RE$<>"Y" THEN 16
17 PRINT"■": POKE59468,12
18 TI$="000000":T=TI+RND(1)*300+60
20 PRINT"■■■■ATTENTION ..."
30 GETA$:IFA$<>""THEN PRINT,"■■■♦♦♦ ■YOU C
HEATED ♦♦♦":GOTO87
35 IFT>TITHEN30
40 PRINT,,"■■■LOS!":T=TI
60 GETA$:IFA$=""THEN60
70 K%=(TI-T)/60*100
```

```
75 GOSUB200
80 PRINT"■■" B$"     REACTION TIME :"K%/100
"SECONDS"
81 IFK%>99THEN PRINT,"■■■HAVE SOME COFFEE
!!":GOTO87
82 M=M+1:TL=TL+K%:L%=TL/M
85 PRINT B$"■     AVERAGE TIME :"L%/100"SE
CONDS"
87 PRINT"■■■■■■■■"
90 PRINT"    C : CONTINUE THIS TEST"
95 PRINT"■   N : NEW GAME"
100 PRINT"■   E : END OF GAME"
110 GETA$:IFA$=""THEN110
120 IFA$="N"THEN M=0:TL=0:GOTO18
130 IFA$="C"THEN18
140 IFA$="E"THEN170
150 GOTO110
170 PRINT"■■■■■■■","E N D  O F  G A M E■■■■
"
180 END
200 PRINT"■■","■TEST OF REACTION■■■"
201 RETURN
```

21 Print Using

When printing numbers you often need a certain format for the numbers- dollar amounts, for example, where you need two digits after the decimal. Some versions of BASIC have a PRINT USING command for that, where you can define the format of numbers using a character string.

Since the COMMODORE 64 doesn't have this command we have to use a subroutine doing that job for us. The program listed below does that for us. The formatting is defined in the subroutine starting at line 50000.

The subroutine uses the following parameters :

UU	number to be printed
US$	USING string, defining format
UL	digits left of decimal
UR	digits right of decimal
UU$	auxiliary string
UP$	auxiliary string
UI	running parameter
UP	position of decimal
UA$	output-string left of decimal
UB$	output-string right of decimal

It is very easy to use the subroutine. Before jumping to the subroutine assign the number to be formatted to variable UU and the format wished to US$.

On BASICs with PRINT USING, the USING string usually consists of number signs (#). With our subroutine, it is two numbers separated by a decimal. For example US$="5. 3" is the same as USING"#####.###".

The first number means the number of digits before the decimal. This number has to be the actual number of digits in front of the decimal plus one, because of the sign of the number. With numbers smaller than one, the program adds the leading zero if it is not there.

The second number means the number of digits behind the decimal. This number may be from 0 through 9.

The program automatically rounds the numbers (4/5 rounding). If you don't enter anything for the digits behind the decimal - for example US$="5." - then the program doesn't round the number.

The standard formula for rounding, INT(100*A+.5)/100, doesn't work for negative numbers, because command INT always creates the next smaller number, for example INT(-.0001) gives you -1 as a result. To get the standard rounding, the program treats the sign of the number separately.

```
5 REM TEST OF PRINT USING
10 PRINT CHR$(147)
20 INPUT"ENTER NUMBER ";A
30 INPUT"ENTER FORMAT ";US$
40 UU=A:PRINT:GOSUB 50010
50 PRINT:PRINT
60 PRINT"NEW NUMBER, NEW FORMAT  (A)"
70 PRINT"SAME NUMBER, NEW FORMAT (B)"
80 GET A$:IF A$="" THEN 80
90 IF A$="A" THEN PRINT:GOTO 20
100 IF A$="B" THEN PRINT:GOTO 30
110 PRINT TAB(POS(X)+VAL(A$));"I";:GOTO 80
```

```
50000 REM *** PRINT USING FOR C64 ***
50010 UP$=RIGHT$(US$,1):UL=INT(VAL(US$))
50015 IF UP$<>"." THEN UR=VAL(UP$):GOTO500
25
50020 UA$=STR$(SGN(UU)*INT(ABS(UU)))+".":U
B$="":UL=UL+1:GOTO50075
50025 UL=INT(VAL(US$))
50030 UU$=STR$(SGN(UU)*(INT(ABS(UU)*10↑UR+
.5))/10↑UR)
50035 UP=0:FOR UI=1 TO LEN(UU$)
50040 IF MID$(UU$,UI,1)="." THEN UP=UI
50045 NEXT UI:IF UP=0 THEN UP=UI:UU$=UU$+"
."
50050 IF UP<>2 THEN 50060
50055 UU$=LEFT$(UU$,1)+"0"+RIGHT$(UU$,LEN(
UU$)-1):UL=UL-1:UR=UR+1
50060 UB$=MID$(UU$,UP,LEN(UU$)+1)+"0000000
00"
50065 UB$=LEFT$(UB$,UR+1)
50070 UA$=LEFT$(UU$,UP-1)
50075 IF LEN(UA$)>UL THEN PRINT"US$ TOO LI
TTLE":STOP
50080 IF LEN(UA$)<UL THEN UA$=" "+UA$:GOTO
 50080
50085 PRINTUA$+UB$;:RETURN
```

NOTES

Hires Plot 22

This program allows you to draw mathematical functions in high resolution graphics. You may enter functions, for example 'Y=SIN(X)' or 'Y=X*X'.

After entering the function to be printed, the program will ask you for the range. Enter, for example '-3, 3' here, if you want the function to be displayed in the range from X=-3 to X=3. The range for Y may be entered by hand also, or you may let the computer decide on that.

```
1 REM PLOT-PROGRAM FOR SINE
4 PRINT"■■■SINE CURVE, FOR NEW DIAGRAM PRE
SS F1":Z=0
5 INPUT"■ENTER NUMBER OF PERIODS ";P
8 A=320/(2*π*P):REM AMPLITUDE
10 V=53248:POKEV+17,59:POKEV+24,24:IFZ>0TH
EN25
20 GOSUB2000
25 SYS49152:Z=Z+1
27 FORX=0TO319:Y=99:GOSUB1000:NEXTX:REM X-
AXIS
28 FORY=0TO199:X=159:GOSUB1000:NEXTY:REM Y
-AXIS
30 FORX=0TO319
40 Y=99-INT(A*SIN((X-159)*2*π*P/319))
45 IFY<0ORY>199THEN60
50 GOSUB1000
60 NEXTX:A$=""
70 GETA$:IFA$<>CHR$(133)THEN70
80 POKEV+17,27:POKEV+24,21:PRINT"■■■NEW EN
TRY":GOTO5
```

```
1000 PX=8*INT(X/8)
1010 PY=320*INT(Y/8)+(YAND7)
1020 SP=8192+PX+PY
1030 PH=2↑(7-(XAND7))
1040 POKESP,PEEK(SP)ORPH
1050 RETURN
2000 FORI=0TO43:READX:POKE49152+I,X:NEXTI
2010 DATA162,16
2020 DATA160,0,169,4,132,253,133,254,138,1
62,4,145,253,200,208,251
2030 DATA230,254,202,208,246,169,0,160,32,
133,253,132
2040 DATA254,162,32,145,253,200,208,251,23
0,254,202,208,246,96
2050 RETURN
```

3-D Plot 23

This program allows you to draw three-dimensional functions on the screen or on a 1525 printer.

After you have started the program with RUN, you have to enter the function in this form :

```
Z=function(X,Y)
```

for example :

```
Z=X+Y*Y  or  Z=SIN(X)/Y
```

The function will be translated and written into the program lines marked with FFFF...

Important note :

You have to type in the program exactly as it is listed, including the FFFFs. If there are characters missing, the program may not work properly because the program would place the function in a wrong area.

After you have entered the function, the computer will ask you for the ranges of X, Y, and Z. Enter, for example '-2,2' if you want the variable to range from -2 to +2. If the ranges for all variables are the same, the display will not be distorted. If the ranges are different for the three axes, there will be a distortion. You also

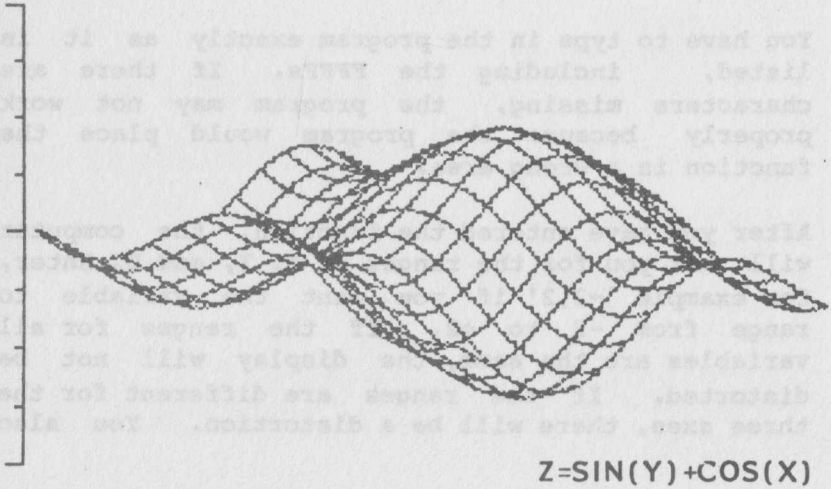
have to enter the number of steps. If you chose a large number here, for example 10 or 20, the graphics will be better, but it will take longer to draw.

When you enter the ranges for the variables X and Y, make sure that the function can be calculated properly by the program for the whole range. You have to avoid mathematically undefined calculations, for example divisions by zero, or logarithms of negative numbers. If the program encounters an invalid mathematical calculation it will stop and display an error message.

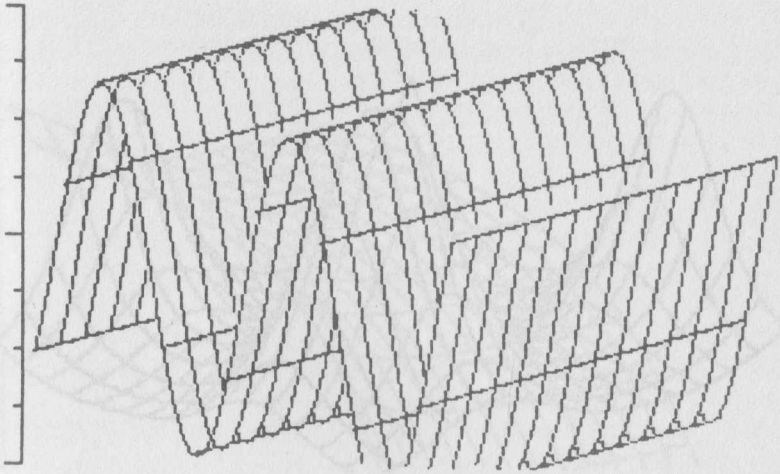
Below you will find some figures drawn by this program.

After entering the necessary information, the program will jump into the high resolution graphics mode and start drawing. When the drawing is finished, the coordinate will be drawn on the left side of the screen. At this point you could press 'P' to send the graphics to a printer hooked up to the computer.

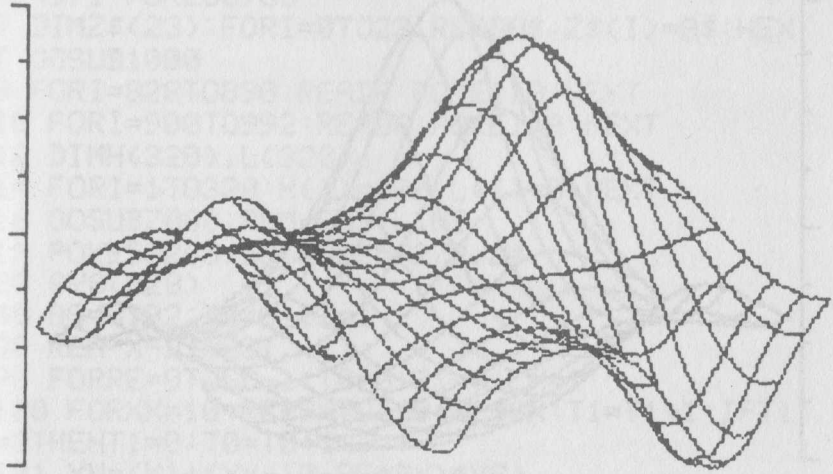
If you wish to draw a new function, do a warmstart by pressing the RUN/STOP and RESTORE keys at the same time and start the program over with RUN.



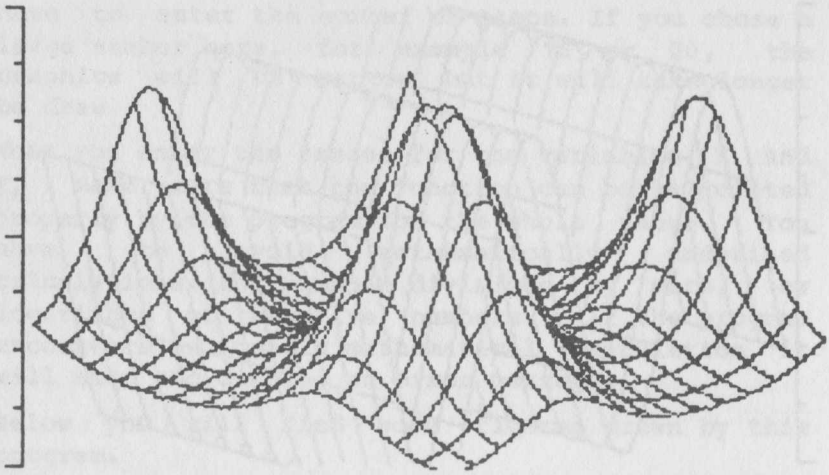
Z=SIN(Y)+COS(X)



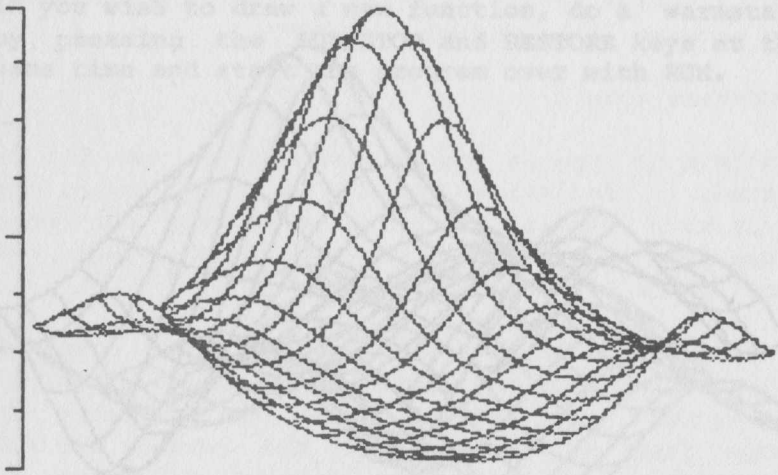
Z=SIN(X)



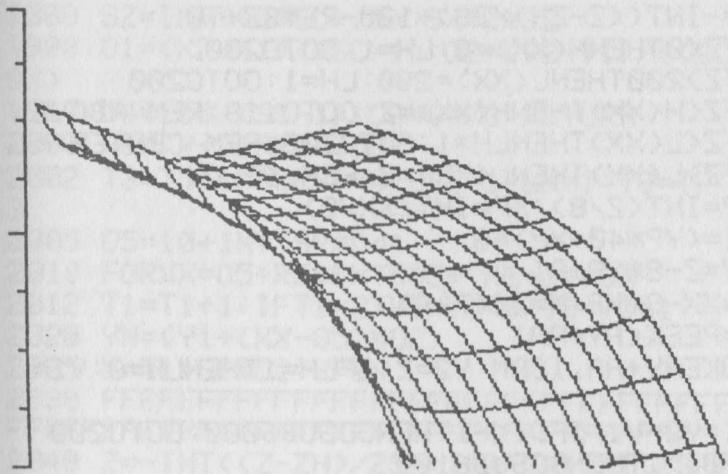
Z=EXP(SIN(Y))*COS(X)



Z=EXP(SIN(X))/EXP(SIN(Y))



Z=EXP(SIN(Y))/EXP(SIN(X))



Z=1/LOG(Y)-EXP(X)

```
1 REM********** 3-D PLOT **********
2 REM**** BY R. HEIGENMOSER ****
5 POKE45,1:POKE46,65:POKE47,1:POKE48,65:PO
KE49,1:POKE50,65
7 DIMZ$(23):FORI=0TO23:READA$:Z$(I)=A$:NEX
T:GOSUB1000
8 FORI=828TO890:READA:POKEI,A:NEXT
10 FORI=900TO992:READA:POKEI,A:NEXT
12 DIMH(320),L(320)
14 FORI=1TO320:H(I)=200:L(I)=0:NEXT
16 GOSUB7000:REM END LINE
18 POKE53265,59:POKE53272,24
20 SYS(828)
40 AA=8192:T2=0:T3=1
80 REM X-DIRECT.
90 FORRE=0TOSC-1:T0=0:T1=0:LH=1
100 FORXX=10+RE*SXTO160+RE*SX:T1=T1+1:IFT1
=3THENT1=0:T0=T0+1
101 XN=(X1+(XX-10-RE*SX)*XS)
103 X=XN:Y=Y1+YS*RE
106 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
```

```
107 Z=-INT((Z-ZH)/ZS)+100-RE*SZ+T0
111 IFZ<0THENH(XX)=0:LH=1:GOTO200
112 IFZ>200THENL(XX)=200:LH=1:GOTO200
116 IFZ<H(XX)THENH(XX)=Z:GOTO118:REM ABOVE
117 IFZ<L(XX)THENLH=1:GOTO200:REM CENTER
118 IFZ>L(XX)THENL(XX)=Z:REM BELOW
120 YP=INT(Z/8):XP=INT(XX/8)
130 A1=(YP*40+XP)*8
140 AY=Z-8*YP+A1
160 R=XX-8*XP:M=2↑(7-R)
180 I=PEEK(AY+AA)
190 POKEAY+AA,IORM:V2=Z:IFLH=1THENLH=0:V1=
V2
195 DI=V2-V1:IFDI<-1THENGOSUB6000:GOTO200
197 IFDI>1THENGOSUB6100
200 NEXTXX:IFRE<SC-1THENGOSUB2000
210 NEXTRE:GOTO2210
1000 PRINT"□":PRINT"@@@ENTER FUNCTION TO B
E DISPLAYED :"
1010 INPUTF$:LE=LEN(F$)
1020 FORI=1TO3:READA:ZA=0
1040 FORJ=1TOLE:F=ASC(MID$(F$,J,1))
1050 IFF<65THEN1100
1052 IFF=94THENF=174:GOTO1140
1055 IFF=88ORF=89ORF=90THEN1140
1060 B$=MID$(F$,J,3)
1065 FORK=0TO23:IFB$=Z$(K)THEN1075
1070 NEXTK:PRINT:PRINT"ERROR !!!":PRINT"ST
ART OVER !":END
1075 F=K+170:J=J+2:GOTO1140
1100 B$=MID$(F$,J,1)
1105 FORK=0TO23:IFB$=Z$(K)THEN1115
1110 NEXTK:GOTO1140
1115 F=K+170
1140 POKEA+ZA,F:ZA=ZA+1:NEXTJ
1150 POKEA+ZA,58:POKEA+ZA+1,143
1160 NEXTI
1250 INPUT"X-RANGE  : ";X1,X2
1260 INPUT"Y-RANGE  : ";Y1,Y2
1270 INPUT"Z-RANGE  : ";Z1,Z2
1280 INPUT"STEPS    : ";SC
1290 ZS=(Z2-Z1)/150:ZH=Z1+(Z2-Z1)/2:XS=(X2
-X1)/150:YS=(Y2-Y1)/(SC-1)
```

```
1300 SZ=INT(40/SC+.5):SX=3*SZ
1900 O1=(X2-X1)/(SC-1):O2=(Y2-Y1)/((SC-1)*
SX)
1910 O4=150/(SC-1):O3=O4/3:RETURN
2000 REM Y-DIRECTION
2002 T3=T3-1:FORSP=0TOSC-1:LH=1:T0=T2:T1=T
3
2005 O5=10+INT(SP*O4)
2010 FORXX=O5+RE*SXTOO5+(RE+1)*SX
2012 T1=T1+1:IFT1=3THENT1=0:T0=T0+1
2020 YN=(Y1+(XX-O5)*O2)
2025 X=X1+SP*O1:Y=YN
2030 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
2040 Z=-INT((Z-ZH)/ZS)+100-T0+INT((SP*O4)/
3)
2060 IFZ<0THENLH=1:GOTO2200
2070 IFZ>200THENLH=1:GOTO2200
2090 IFZ<L(XX)THENIFZ>H(XX)THENLH=1:GOTO22
30:REM CENT.
2110 YP=INT(Z/8):XP=INT(XX/8)
2120 A1=(YP*40+XP)*8
2130 AY=Z-8*YP+A1
2140 R=XX-8*XP:M=2↑(7-R)
2150 I=PEEK(AY+AA)
2160 POKEAY+AA,IORM:V2=Z:IFLH=1THENLH=0:V1
=V2
2165 DI=V2-V1:IFDI<-1THENGOSUB6000:GOTO220
0
2167 IFDI>1THENGOSUB6100
2200 NEXTXX:NEXTSP:T2=T0:T3=T1:RETURN
2210 A=0:B=0:FORZ=0TO200
2220 IFZ<>ATHEN2250
2230 FORXX=BTO6:GOSUB2500:NEXTXX
2240 READA,B
2250 XX=6:GOSUB2500
2260 NEXTZ
2270 GETB$:IFB$=""THEN2270
2280 IFB$="P"THEN8000
2290 END
2500 YP=INT(Z/8):XP=INT(XX/8)
2505 A1=(YP*40+XP)*8
2510 AY=Z-8*YP+A1
```

```
2520 R=XX-8*XP:M=2↑(7-R)
2530 I=PEEK(AY+AA)
2540 POKEAY+AA,IORM:RETURN
4800 DATA+,-,*,/,↑,AND,OR,>,=,<,SGN,INT,AB
S,USR,FRE,POS,SQR,RND,LOG,EXP
4810 DATACOS,SIN,TAN,ATN
4900 DATA2534,3868,5800
5000 DATA169,0,133,251,169,4,133,252,162,0
,169,15,129,251,230,251,208,2,230,252
5010 DATA165,251,201,232,208,240,165,252,2
01,7,208,234,169,32,133,252,169,0,133
5020 DATA251,169,0,129,251,230,251,208,2,2
30,252,165,251,201,0,208,240,165,252
5030 DATA201,64,208,234,96
5035 REM PRINT SR
5040 DATA162,0,169,128,141,232,3,169,0,141
,233,3,160,0,177,251,45,232,3
5045 DATA240,5,169,128,76,160,3,41,0,13,23
3,3
5050 DATA24,106,141,233,3,200,192,7,208,22
9,9,128,142,235,3,162,0,238,234,3,230
5060 DATA253,208,2,230,254,129,253,174,235
,3,232,224,8,240,7,24,110,232,3,76,139
5070 DATA3,165,251,24,105,8,133,251,144,2,
230,252,173,234,3,201,160,208,164,96
5100 DATA24,3,49,3,74,3,99,0,124,3,149,3,1
74,3,199,0,0,0
5110 DATA25,3,43,3,62,3,81,5,100,3,118,3,1
37,3,156,5,0,0
5120 DATA171,3,186,3,201,3,216,5,231,3,246
,3,261,3,276,5,0,0
6000 FORZ=V2+1TOV1-1
6010 YP=INT(Z/8):XP=INT(XX/8)
6020 A1=(YP*40+XP)*8
6030 AY=Z-8*YP+A1
6050 I=PEEK(AY+AA)
6060 POKEAY+AA,IORM
6070 NEXTZ:V1=V2:RETURN
6100 FORZ=V2-1TOV1+1STEP-1
6110 YP=INT(Z/8):XP=INT(XX/8)
6120 A1=(YP*40+XP)*8
6130 AY=Z-8*YP+A1
6150 I=PEEK(AY+AA)
```

```
6160 POKEAY+AA,IORM
6170 NEXTZ:V1=V2:RETURN
7000 RE=SC-1:T0=0:T1=0
7010 FORXX=10+INT(RE*04)TO10+(SC-1)*SX+INT
(RE*04):T1=T1+1:IFT1=3THENT1=0:T0=T0+1
7020 YN=(Y1+(XX-10-INT(RE*04))*02)
7025 X=X1+RE*01:Y=YN
7030 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
7040 Z=-INT((Z-ZH)/ZS)+100+INT(RE*03)-T0
7100 H(XX)=Z
7200 NEXTXX:RETURN
8000 ZE=50:REM PRINT ROUTINE
8010 POKE251,0:POKE252,32:ZA=0
8012 FORK=1TOZE:POKE253,63:POKE254,31:POKE
1002,0
8015 SYS(900):A$=""
8020 FORI=8000TO8159
8030 A=PEEK(I)
8040 A$=A$+CHR$(A)
8050 NEXTI
8060 ZA=ZA+1:OPEN4,4:PRINT#4,CHR$(8)A$;
8065 IFZA=2THENZA=0:PRINT#4
8067 CLOSE4
8070 NEXTK:IFZE<50THEN8300
8100 SYS(828)
8110 K=0:T0=0:A=6:B=5:FORXX=6TO156
8120 IFA<>XXTHEN8150
8130 FORZ=KTOK+B:GOSUB2500:NEXTZ
8140 READA,B
8150 Z=K:GOSUB2500:T0=T0+1:IFT0=3THENT0=0:
K=K+1
8160 NEXTXX
8210 K=50:T0=0:A=156:B=5:FORXX=156TO276
8220 IFA<>XXTHEN8250
8230 FORZ=KTOK+B:GOSUB2500:NEXTZ
8240 READA,B
8250 Z=K:GOSUB2500:T0=T0+1:IFT0=3THENT0=0:
K=K-1
8260 NEXTXX:ZE=14:GOTO8010
8300 OPEN4,4:PRINT#4,CHR$(15)
8310 CMD4:PRINT
```

```
8315 PRINT"FUNCTION: ";F$:PRINT
8320 PRINT"X-RANGE  : ";X1;" - ";X2
8330 PRINT"Y-RANGE  : ";Y1;" - ";Y2
8340 PRINT"Z-RANGE  : ";Z1;" - ";Z2
8345 PRINT"STEPS    : ";SC
8350 CLOSE4:END
```

Function Keys 24

The following two programs take advantage of the function keys on the right hand side of your keyboard (f1 through f8).

The first program assigns often used BASIC words to the function keys. You then only have to press the proper funtion key to get the commands on the screen.

```
50 REM PROGRAMMABLE FUNCTION KEYS
60 REM LOAD MACHINE LANGUAGE
70 A=50176:B=80
80 FORI=ATOA+B:READD:POKEI,D:NEXTI
90 REM DATA MACHINE LANGUAGE
100 DATA169,11,160,196,141,143,2,140,144,2

110 DATA96,162,6,228,203,240,8,202,224,2
120 DATA208,247,76,72,235,228,197,240,249,
134
130 DATA197,173,141,2,201,1,208,4,232,232
140 DATA232,232,216,169,0,224,3,240,8,24
150 DATA105,9,202,224,3,208,248,170,160,0
160 DATA200,189,81,196,153,118,2,201,13,24
0
170 DATA5,232,192,9,48,240,132,198,76,66,2
35
190 SYS50176:REM START
240 REM INPUT OF TEXT
260 A=50257:B=71
270 FORI=ATOA+B:READD:POKEI,D:NEXTI
290 REM DATA TEXT
300 DATA80,82,73,78,84,35,0,0,0:REM PRINT#
```

```
310 DATA82,85,78,13,0,0,0,0,0:REM RUN
320 DATA76,79,65,68,0,0,0,0,0:REM LOAD
330 DATA79,80,69,78,0,0,0,0,0:REM OPEN
340 DATA73,78,80,85,84,35,0,0,0:REM INPUT#

350 DATA76,73,83,84,0,0,0,0,0:REM LIST
360 DATA83,65,86,69,0,0,0,0,0:REM SAVE
370 DATA67,76,79,83,69,0,0,0,0:REM CLOSE
```

The commands used are :

PRINT#
RUN
LOAD
OPEN
INPUT#
LIST
SAVE
CLOSE

The second program allows you to assign your own text to the function keys. The text for each key may be up to 9 characters long.

```
1000 PRINT"□":FORI=1TO8:READS:S(I)=S+50256
:NEXTI
1010 PRINT"NUMBER OF FUNCTION KEY ";
1020 GETA:IFA=0THEN1020
1030 IFA=9THEN1020
1040 PRINTA:PRINT:PRINT"ENTER TEXT (@ FOR
RETURN) : "
1050 INPUTT$:IFLEN(T$)>9THEN1050
1060 FORI=1TOLEN(T$):F$=MID$(T$,I,1)
1070 F=ASC(F$):IFF=64THENF=13
1080 POKES(A)+I,F:NEXTI
1090 FORI=LEN(T$)+1TO9:POKES(A)+I,0:NEXTI
1100 PRINT:PRINT"ANOTHER KEY (Y/N) "
1110 GETA$:IFA$="Y"THEN1010
1120 IFA$="N"THENEND
1130 GOTO1110
1200 DATA9,45,18,54,27,63,0,36
```

This program only works if the machine language routine from the first program is still in memory.

Here is a disassembly listing of that machine language routine :

```
C400  LDA  #$0B
C402  LDY  #$C4
C404  STA  $028F
C407  STY  $0290
C40A  RTS
C40B  LDX  #$06
C40D  CPX  $CB
C40F  BEQ  $C419
C411  DEX
C412  CPX  #$02
C414  BNE  $C40D
C416  JMP  $EB48
C419  CPX  $C5
C41B  BEQ  $C416
C41D  STX  $C5
C41F  LDA  $028D
C422  CMP  #$01
C424  BNE  $C42A
C426  INX
C427  INX
C428  INX
C429  INX
C42A  CLD
C42B  LDA  #$00
C42D  CPX  #$03
C42F  BEQ  $C439
C431  CLC
C432  ADC  #$09
C434  DEX
C435  CPX  #$03
C437  BNE  $C431
C439  TAX
C43A  LDY  #$00
C43C  INY
C43D  LDA  $C451,X
C440  STA  $0276,Y
```

```
C443  CMP  #$0D
C445  BEQ  $C44C
C447  INX
C448  CPY  #$09
C44A  BMI  $C43C
C44C  STY  $C6
C44E  JMP  $EB42
```

Here is a list of addresses used by the machine language program :

00C5	key pressed last
00C6	number of characters in input queue
00CB	currently pressed key
0277-0280	keyboard buffer
028D	flag for SHIFT/CTRL/C= keys
028F-0290	keyboard vector
EB42	end of keyboard poll
EB48	start of keyboard poll

Calculation of PI 25

The formula for a circle with a radius of 1 is :

X*X+Y*Y=1

(figure book #160 pg. 112)

If pairs of random numbers are created between 0 and 1, as X and Y, the co-ordinates of points will result. If X*X+Y*Y is smaller than 1, the point is within the quarter circle; otherwise, it is within the shaded area.

The program listed below uses these facts to calculate PI.

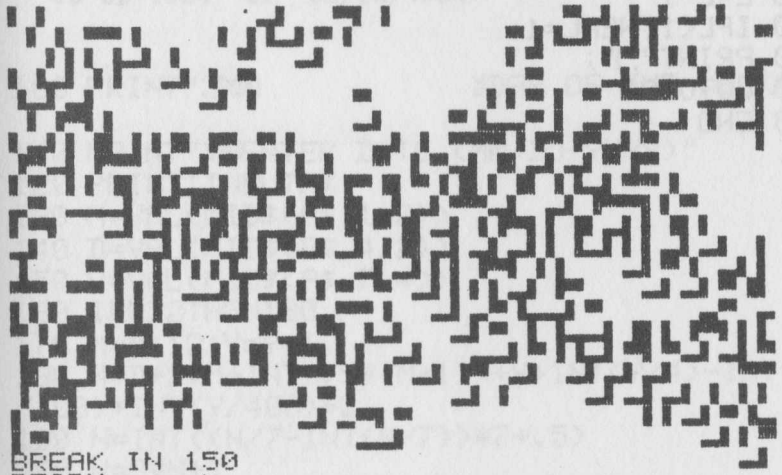
```
10 REM CALCULATION OF PI
20 PRINT"□":REM CLEAR SCREEN
30 G=1.61803
40 INPUT"SEED (0.1 TO 0.9)";Y
50 GOTO  100
60 Y=100*(G↑Y):Y=Y-INT(Y):RETURN
62 J=INT((4*HI/T-3.14159)*100)+40:IFJ<1THE
NJ=1
64 IF J>78 THEN J=78
70 IF J>40 THEN PRINT TAB(40);"!";TAB(J);"
*":RETURN
80 IF J<40 THEN PRINT TAB(J);"*";TAB(40);"
!":RETURN
90 PRINTTAB(40);"*":RETURN
100 FOR TR=1 TO 50
110 GOSUB 60:X=Y:GOSUB60
```

```
120 IF X*X+Y*Y<=1 THEN HI=HI+1
130 T=T+1
140 GOSUB 62
150 NEXT TR
160 PI=4*HI
170 PRINT"AFTER";T;"CYCLES : PI=";PI/T
180 GOTO 100
```

Screen Graffiti

26

The program listed below creates random patterns on your screen. Below is a sample printout in black and white. On a color monitor you can see the graphics in color.



```
BREAK IN 150
READY.
SYS31640
```

```
120 PRINT"
;
130 POKE53280,1:POKE53281,1:L=12
140 D=INT(4*RND(1))+1
150 IFD=1THEN250
```

```
160 IFD=2THEN320
170 IFD=3THENPRINT"■";
180 IFD=4THENPRINT"■■";
190 IFD=1THENPRINT"■■ ";
200 IFD=2THENPRINT"■■■■";
210 IFD=3THENPRINT"■■ ■■";
220 IFD=4THENPRINT"■■ ■■";
230 PRINT"■■";
240 GOTO140
250 L=L+1
260 IFL=24THEN290
270 PRINT"■";
280 GOTO190
290 D=2
300 L=L-1
310 GOTO150
320 L=L-1
330 IFL<1THENL=1
340 PRINT"■";
350 GOTO190
360 END
```

Day of the Week 27

This program calculates the day of the week for any date entered. Make sure you enter the date in the correct form, for example March 2nd 1984 is entered as follows :

03-02-1984 or 03/02/1984

```
100 PRINT"■■■                ■DAY OF THE WEEK■"

110 PRINT"■■ENTER DATE (MM-DD-YYYY)"
120 PRINT:INPUTA$
130 M=VAL(MID$(A$,1,2))
140 D=VAL(MID$(A$,4,2))
150 Y=VAL(MID$(A$,7,4))
160 IFM>2THEN180
170 M=M+12:Y=Y-1
180 N=D+2*M+INT(.5*(M+1))+Y+INT(Y/4)-INT(Y
/100)+INT(Y/400)+2
190 N=INT((N/7-INT(N/7))*7+.5)
200 N=3*N+1
210 W$="SATSUNMONTUEWEDTHUFRI"
220 PRINT
230 PRINT"          ■";A$;" IS A ";MID$(W$,
N,3);"■"
```

NOTES

Number Conversion 28

This little program is helpful if you need to convert decimal numbers into another system of numbers. All you have to do is enter the decimal number to be converted and the base of the new number system. For example, enter '16' for the base if you want to convert into the hexadecimal system, or '2' if you want to convert into the binary system.

```
100 REM CONVERSION OF A DECIMAL NUMBER
110 DIML(16)
120 PRINT"■"
130 INPUT"ENTER DECIMAL NUMBER ";N
140 INPUT"ENTER NEW BASE       ";B
150 I=0
160 I=I+1
170 R=(N/B-INT(N/B))*B
180 L(I)=R:N=INT(N/B)
190 IFN>=BTHEN160
200 I=I+1:L(I)=N
210 PRINT:PRINT"RESULT :":PRINT
220 N$="ABCDEF"
230 FORJ=ITO1STEP-1
240 IFL(J)>=10THEN270
250 PRINTL(J);"■";
260 NEXTJ:PRINT:PRINT:GOTO300
270 L(J)=L(J)-9
280 PRINTMID$(N$,L(J),1);
290 GOTO260
```

```
300 PRINT"PRESS SPACE BAR FOR NEXT CONVERS
ION"
310 GETA$:IFA$=""THEN310
320 GOTO120
```

Forecasting 29

There are mathematical procedures available to forecast future events, for example sales for a future month, based on past numbers.

Most mathematical procedures for forecasting value all numbers equal, even those that are dating back very far. The procedure shown here values past numbers with an exponentially decreasing factor, which means that past events contribute only a certain percentage to the forecast.

The following formula is used to calculate the forecast. In the formula, 'F' stands for forecast, 'R' for the result, and 'i' for the time index.

$$V_{i+1}=E_i+\alpha(V_i-E_i) \text{ with } 0 < \alpha < 1$$

The forecast for the time 'i+1' is calculated using the last result (at the time 'i') plus a part of the difference between the last forecast and the actual result. Factor alpha, which can be between 0 and 1, controls the forecast. If alpha is 1, then the forecast for the time 'i+1' is equal to the forecast for the time 'i', which means a constant forecast. If alpha is 0, then the forecast for the time 'i+1' is equal to the result at the time 'i'.

If you solve the above equation you get :

$$V_{i+1}=E_i(1-\alpha)+\alpha\cdot[E_{i-1}\cdot(1-\alpha)+\alpha\cdot V_{i-1}]=$$

$$=(1-\alpha)\cdot E_i+\alpha\cdot(1-\alpha)\cdot E_{i-1}+\alpha^2\cdot(1-\alpha)\cdot E_{i-2}+\alpha^3(1-\alpha)\cdot E_{i-3}+\alpha^4 V_{i-3}$$

As you can see you can neglect results of the distant past, if alpha is small. It is recommended to use values from 0.2 to 0.3 for alpha.

To improve the forecast, we take into consideration the trend. Trend means the difference between the results at the time 'i' and 'i+1'.

To forecast the trend, we use the same technique as used with forecasting the results. TF is the trend forecast :

$$TV_{i+1}=T_i+\beta(TV_i-T_i),$$

with β being the trend factor ($0<\beta<1$) and $T_i=E_i-E_{i-1}$.

where beta is the trend factor, which should be between 0 and 1 too. The trend 'T' at the time 'i' is the difference between the results at the time 'i' and the time 'i-1'. This again has the effect that data from the distant past are valued less.

The final forecast is calculated as follows :

$$VS_{i+1}=V_{i+1}+TV_{i+1}\ .$$

The program calculates all these numbers and displays the forecast for the next period (i+1).

Alpha and beta strongly influence the forecast. You should select values from 0.2 to 0.3 for both. Try to experiment to find out the best values for your forecasts.

```
10 REM ANALYSING A TREND
20 PRINT"□"
30 PRINT"      *** ANALYSIS AND FORECAST **
*"
40 PRINT:INPUT"ENTER ALPHA (0<=A<=1) ";A
50 IFA<0ORA>1THEN40
60 INPUT"ENTER BETA (0<=B<=1)  ";B
70 IFB<0ORB>1THEN60
80 INPUT"ENTER 1ST FORECAST ";V0
90 INPUT"ENTER 1ST RESULT   ";E0
100 N=1:E1=E0:V1=V0:T0=0
110 PRINT"□":GOSUB2000
120 REM FUNDAMENTAL FORECAST
130 V1=E0+A*(V0-E0)
140 REM CALCULATION OF TREND
150 TR=E0-E1+B*(T0-(E0-E1))
160 IFTR=0THEN200
170 T$="+":IFTR<0THENT$="-"
180 PRINT"□";TAB(28);T$
190 REM FORECAST
200 V=V1+TR
210 V0=V1:V1=V:E1=E0:T0=TR
220 PRINTN+1;TAB(10);INT(V*100+.5)/100;TAB
(19);:INPUTE0
230 N=N+1
240 IFE0<1THENEND
250 GOTO120
2000 PRINT"ALPHA=";A;"     BETA=";B
2010 PRINT
2020 PRINT"PERIOD  FORECAST  RESULT  TREND
"
2030 PRINT
2040 PRINTN;TAB(10);V0;TAB(20);E0:RETURN
```

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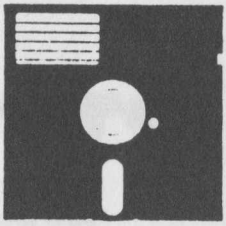

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